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THE UNIVERSITY CALENDAR

1939-40

1939

FIRST TERM

Sept.	18, <i>Monday</i> ,	Entrance examinations begin.
Sept.	25, <i>Monday</i> ,	Registration and assignment, new students.
Sept.	26, <i>Tuesday</i> ,	Registration and assignment, old students.
Sept.	28, <i>Thursday</i> ,	Instruction begins at 8 A.M.
Oct.	19, <i>Thursday</i> ,	Last day for the payment of tuition for the first term.
Nov.	29, <i>Wednesday</i> ,	Instruction suspended at 4 P.M. (<i>Thanksgiving Recess</i>)
Dec.	4, <i>Monday</i> ,	Instruction resumed at 8 A.M.
Dec.	20, <i>Wednesday</i> ,	Instruction suspended at 4 P.M. (<i>Christmas Recess</i>)
	1940	
Jan.	4, <i>Thursday</i> ,	Instruction resumed at 8 A.M.
Jan.	11, <i>Thursday</i> ,	Founder's Day.
Jan.	29, <i>Monday</i> ,	Final examinations begin.
Feb.	7, <i>Wednesday</i> ,	Final examinations end.
Feb.	8, <i>Thursday</i> ,	A holiday.

SECOND TERM

Feb.	9, <i>Friday</i> ,	Registration of all students.
Feb.	12, <i>Monday</i> ,	Instruction begins at 8 A.M.
March	4, <i>Monday</i> ,	Last day for the payment of tuition for the second term.
March	30, <i>Saturday</i> ,	Instruction suspended at 12:50 P.M. (<i>Spring Recess</i>)
April	8, <i>Monday</i> ,	Instruction resumed at 8 A.M.
May	—, <i>Saturday</i> ,	Spring Day: a holiday.
June	3, <i>Monday</i> ,	Final examinations begin.
June	11, <i>Tuesday</i> ,	Final examinations end.
June	17, <i>Monday</i> ,	COMMENCEMENT.

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CHARLES NEWELL ST. JOHN, JR., A.B., Assistant in the Romance Languages.
ROBERT JAMES SCHATZ, M.S., Assistant in Chemistry.
DANIEL SCOTT SEARS, B.S., Assistant in Chemistry.
JOHN CARL SEDDON, A.M., Assistant in Physics.
CHARLES EDWARD SEVICK, M.A., Assistant in Philosophy.
ARNOLD GOTTFRED SKRIVSETH, A.B., Assistant in Physics.
JOHN ELBRIDGE SNOW, M.S., Assistant in Chemistry.
PAUL LEON SOPER, M.A., Assistant in Public Speaking.
ARTHUR MORTON SQUIRES, A.B., Assistant in Chemistry.
JAMES DANIEL STROUPE, A.B., Assistant in Chemistry.
ORVILLE JOHN SWEETING, A.B., Assistant in Chemistry.
WILLIAM JOUETTE TAPP, B.S., Assistant in Chemistry.
FRANCES RUTH THOMSON, B.A., Assistant in Public Speaking.
JOHN WILSON TRISCHKA, B.S. in E.E., Assistant in Physics.
ROHN TRUELL, B.S., Assistant in Physics.
JOHN HOWARD VAN DYKE, M.S., Assistant in Histology and Embryology.
WILLIAM BROWN VINCENT, A.B., Assistant in Chemistry.
FRED C. VONDER LAGE, B.S., Assistant in Physics.
CHARLES PHILIP WALTERS, M.S., Assistant in Geology.
JOHN GAUL WATSON, A.B., Assistant in Geology.
ROBERT STEPHEN WEISZ, Assistant in Chemistry.
JOHN FRANKLIN WHITNEY, B.S., Assistant in Chemistry.
ELIZABETH ELEANOR WILBURN, A.B., Assistant in Public Speaking.
MAX BULLOCK WILLIAMS, M.S., Assistant in Chemistry.
GARFF BELL WILSON, M.A., Assistant in Public Speaking.
JOHN MARTIN WITZEL, M.A., Assistant in Chemistry.
JOHN SCHILLER WOLD, A.B., Assistant in Geology.
ELIZABETH DOROTHY WORMAN, M.A., Assistant in Public Speaking.
FRANK LAURETS ZOLANEK, A.B., Assistant in History.

ARTS AND SCIENCES

THE COLLEGE OF ARTS AND SCIENCES offers instruction in classical and modern languages and literatures, in history and the social studies, in psychology, philosophy, education, and music, in mathematics, and in the natural sciences. The student is expected first to pursue certain courses which will complete his basic preparation in English, in a foreign language, in history, and in a laboratory science. During his second year he may select a major field of study for the remainder of his course. This requirement is broadly conceived to include a sequential and a related group of courses by means of which the student is enabled to secure a certain mastery of one non-technical field of knowledge. The remainder of his course of study is largely elective under the supervision of a faculty adviser whom he chooses, and who will assist him in making a reasonable and appropriate selection of courses. Many of the course offerings of the other colleges are available to him, not only as electives but also as related subjects in the fulfillment of his major requirements.

The general purpose of the College of Arts and Sciences is liberal and non-technical. The definition of a liberal college is found in the subjects which make up its curriculum, namely those subjects which in the history of human civilization have differentiated themselves as the means whereby man has come to understand himself and the world in which he lives. The meaning of a liberal education as thus conceived is a special knowledge of some general field of human understanding erected upon a fundamental training in science and the humanities and spreading into such related subjects as will give breadth as well as concentration of knowledge.

The facilities of the college are adequate in staff, housing, and equipment to give personal attention to the varying needs of individual students, especially those of a pre-vocational and pre-professional nature. Advanced courses and opportunities for research are available even in the undergraduate years to those who are qualified to make use of them, for in addition to his regular courses, a student may also work informally under the supervision of his major adviser, and thus in part complete his education in ways more flexible than the usual courses of study will permit. A student is expected to accept a large degree of personal responsibility for shaping his own courses of study, but the student's adviser stands ready to assist him in all possible ways to make the most of his opportunities.

REQUIREMENTS FOR ADMISSION

For admission to the College of Arts and Sciences fifteen entrance units, approved by the University Director of Admissions, are required. The fifteen must include three of English, three of one foreign language, two of algebra (elementary and intermediate), one unit of plane geometry, and one of history. If two additional units are not offered in a second foreign language, two additional units must be in history *or* in sciences including chemistry or physics, *or* in advanced mathematics and a science. Detailed

information concerning the four ways of gaining entrance—by Cornell entrance examinations, by College Entrance Examination Board examinations, by Regents examinations, and by school certificate—will be found in the *General Information Number* issued by the University. Recourse should be had to this publication for useful notes on expenses, scholarships, loan funds, and matters of general student interest. The *General Information Number* and all other official publications of Cornell University may be obtained on application to the Secretary of the University, Morrill Hall, Ithaca, New York. Application forms are to be had from the University Director of Admissions in Morrill Hall.

ADMISSION TO ADVANCED STANDING

A student admitted to the College of Arts and Sciences from another college of Cornell University, or from any other institution of collegiate rank, will receive credit toward the degree of Bachelor of Arts for the number of hours to which his records may, in the judgment of the Faculty, entitle him. In order, however, to obtain the degree of Bachelor of Arts, he must, as a candidate for that degree, have been in residence at least two terms in the College of Arts and Sciences, and in that college only.

Credit toward a degree for work done in a preparatory school, upon subjects which may be offered for entrance to the University, may be given only to those students who, in addition to satisfying all entrance requirements, pass separate examinations in the subjects for which they seek college credit. These examinations will cover substantially the same ground as the University courses in the corresponding subjects. An applicant who desires a college-credit examination of this kind must apply to the Office of Admissions as early as possible and in no case later than the day preceding the beginning of the entrance examinations, specifying which fifteen units he intends to offer in satisfaction of the entrance requirements, and upon what other entrance subjects he wishes to be examined for college credit.

In case he fails to satisfy the entrance requirements in any one or more of the subjects which he has offered for entrance, but passes the college-credit examination in any other subject or subjects, he may use the latter for satisfying the entrance requirements, but in that case he cannot also receive college credit therefor. The college-credit examinations will be held on the date set for the entrance examinations in the same subjects, and unless otherwise arranged, only at Ithaca.

To freshmen in the College of Arts and Sciences these college-credit examinations are open at the end of their first term as well as at entrance. Moreover freshmen of this College may take college-credit examinations in subjects for which no entrance credits have been offered provided they furnish the department concerned with evidence of preparation warranting the examination.

CREDIT FOR SUMMER SESSION

To obtain credit by means of work done in Cornell summer sessions, a student must previously have satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. Credit for a maximum of thirty hours, but no more, may be secured in this way.

Credit will be allowed, under the same restrictions, for work done in summer sessions of other universities belonging to the Association of American Universities, by a student regularly registered in this College, but permission to offer such credit must be obtained in advance from the Dean of this College.

REGISTRATION

Students will file their study cards at the office of the Dean in accordance with instructions issued at the time of registration.

With the consent of the Dean and the approval of his adviser, a student may alter his list of courses during the first ten days of instruction. Thereafter, no student will be permitted to cancel his registration for any course in which he is registered, unless he shall previously have obtained from the Dean authorization to do so on the ground of ill health, or for other reasons beyond the student's control.

REGISTRATION IN TWO COLLEGES OF THE UNIVERSITY. A student who has completed at least ninety hours in courses given in the College of Arts and Sciences may, with the permission of the Faculties concerned, be registered both in the College of Arts and Sciences and also in the Medical College or the Law School. (See MAJOR SUBJECTS, Section IIb.) It should be noted, however, that admission to the Medical College is closely restricted, and that in recent years the Medical College has been able to grant this privilege of double registration to only a small proportion of the fourth year students of the College of Arts and Sciences who applied and who were formally eligible for it. Students who contemplate obtaining the A.B. and an Engineering degree by a combined six-year course, are urged to consult the Dean's Office.

REQUIREMENTS FOR GRADUATION

Two courses are at present offered in the College of Arts and Sciences, one leading to the degree Bachelor of Arts, one to the degree Bachelor of Chemistry. No new candidates, however, will be accepted hereafter for the degree Bachelor of Chemistry, and the curricula leading to the degrees Bachelor of Chemical Engineering and Chemical Engineer will be under the jurisdiction of the College of Engineering.

The College of Arts and Sciences will not confer a degree upon any student who has not been in residence at Cornell during the last two terms preceding graduation, nor upon any student who has not been in residence during at least two terms in this College and in this College only.

THE DEGREE OF BACHELOR OF ARTS

For graduation with the degree Bachelor of Arts a candidate must meet the following requirements:

1. Credit for one hundred and twenty hours, of which at least ninety hours must be for courses given in the College of Arts and Sciences. Military Science 2 and courses in Hygiene, all of which are offered under the jurisdiction of the University but not of any College, may be counted as part of the thirty hours which a student may elect outside the College of Arts and Sciences, but may not be counted as part of the ninety hours required in the College.
2. A grade of 70 or better in at least sixty of the required one hundred and twenty hours.
3. Election of courses in accordance with Sections I-II, Courses of Study.

4. Completion of the work in Hygiene and Preventive Medicine, and in Military Drill or in Physical Training prescribed by the University Faculty. (See pages 82-83.)

BACHELOR OF ARTS WITH DISTINCTION

The degree of Bachelor of Arts with Distinction in the field of a student's major subject will be conferred upon those students who, in addition to having completed the requirements for the degree of Bachelor of Arts, shall (1) have received a grade of 85 or better in at least sixty hours of the courses for which they have been enrolled and an average of 85 in the courses for which they have been enrolled in the field of their major subject and its related courses; (2) have, at the option of the department, taken and passed with distinction a comprehensive examination in the major subject; (3) have been recommended for the said degree by the department representing their major subject.

The degree of Bachelor of Arts with Distinction in General Studies will be conferred upon those students who, in addition to having completed the requirements for the degree Bachelor of Arts, shall (1) have received the grade of 80 or better in at least ninety hours of courses, and of 90 or better in at least sixty of these; (2) not have received a grade below 70 in more than one course; (3) have received no marks lower than 60. To qualify for the degree of Bachelor of Arts with Distinction in General Studies, a candidate must have completed at least sixty hours at Cornell in courses taught in the College of Arts and Sciences; and if he has received credit towards his degree for work done in another institution, the requirement of grades shall be prorated for the residue of work which must be completed in Arts and Sciences at Cornell.

BACHELOR OF CHEMISTRY

The requirements for the degree Bachelor of Chemistry, to candidacy for which degree no new applicants will now be admitted (see page 13), are set forth on pp. 18-19 of the Announcement for 1937-38.

COURSES OF STUDY

I. PRESCRIBED SUBJECTS.

Before graduation a student must satisfy a requirement in each of the following five groups either by completing the prescribed course or by passing a college-credit examination in its equivalent (see ADMISSION TO ADVANCED STANDING, p. 12, and COURSES OPEN TO FRESHMEN, paragraph d).

1. *English*, by completing English 2.

This course must be begun in the first year of residence. Students excused from the second term of English 2 may complete the requirement by other courses in English approved by the department, or by Public Speaking 1.

2. *Foreign Languages*, by completing one of the following:—Greek 2a and 2b; Latin 1a; Latin 1; German 4; German 5; German 7; French 4a and 5a;

French 6; Spanish 4 and 5; Spanish 6; Italian 4; any more advanced six-hour course in these subjects.

A course in a foreign language must be included in the schedule of courses for the first year of residence.

3. *History*, by completing one of the following:—History 1; History 21; History 42; History 61; History 82 and 83; History 86 and 87.

4. *Laboratory Science*, by completing one of the following:—Astronomy 180 and 181; General Biology 1; Botany 1; Chemistry 102 or 104; Geology A; Physics 3 and 4, or 3 and 6; Zoology 1.

5. *Economics*, or *Government*, or *Mathematics*, or *Philosophy*, or *Psychology*. Before graduation a student must complete the equivalent of a year's work (normally six hours) in one of the foregoing subjects.

A normal schedule for a freshman will include courses in at least two of groups 3, 4, and 5.

II. MAJOR SUBJECTS.

a. *Selection of major subject and adviser*. After the first year of residence and before registering for the first term of the third year, a student must select his major subject from options offered by the departments listed below. He must at the same time select as major adviser a designated representative from the department in which he has selected his major subject. During the remainder of his residence he will consult with his major adviser in arranging his course and must obtain his signature to the study card before filing it in the Dean's office.

Astronomy
Biology (including Botany)
Chemistry
The Classics
Comparative Study of
Literature
Economics
Education
English
The Fine Arts
Geology
German

Government
History
Mathematics
Music
Philosophy
Physics
Psychology
Public Speaking
Romance Languages
Scandinavian Languages and
Literatures
Sociology and Anthropology

b. *Major Requirements*. Before graduation, a student must complete courses in satisfaction of the requirement in his major subject. A statement of this requirement, indicating courses and total hours required, appears before the list of courses in each of the departments. He must also complete courses in satisfaction of a requirement in related subjects. A statement of this requirement, with a list of courses from which selection is to be made, appears at the same place. Selection of courses to be offered in satisfaction of these requirements is subject to the restriction that twenty-four hours of the total must be chosen from courses not marked by asterisks. If a comprehensive examination is included in the requirements of the major subject, this must be passed before graduation.

Courses completed before the selection of the major subject, including those offered in satisfaction of requirements in prescribed subjects, may be accepted in satisfaction of these requirements.

Upon recommendation of the major adviser, the Dean may excuse a student registered in this College and in another college of the University from not more than eighteen hours of his major requirements.

c. Informal Study.

The major requirements in certain subjects may be satisfied in part by informal study. A statement to this effect appears before the list of courses in those subjects in which informal study is arranged. Departments may require informal study of some or all of their major students, or may admit them to it upon application.

Informal study will consist of readings, reports, experimentation, senior theses, or other work intended to require from the student the expression of initiative in his major subject or in a related field approved by his adviser. This work will be supervised by the major adviser or by a member of the instructing staff approved by him, and may be tested by examination at the option of the department.

A student who has credit for sixty hours of courses is eligible for informal study. He may earn credit by this means to the amount of six hours in the junior year, and of twelve hours in the senior year.

III. COURSES OPEN TO FRESHMEN.

a. The following are the courses in the College of Arts and Sciences open to freshmen, except that (1) a student may not register for any of these courses for which he has not satisfied the prerequisites, if any are specified (see announcement under each course); (2) a student may not register for any of these courses for which he has presented an acceptable equivalent at entrance:

Astronomy 180, 181
 Biology 1
 Botany 1
 Chemistry 102, 104, 110, 115, 203
 English 2, 2a, 15
 Entomology 21a
 Fine Arts A, 1a, 1b, 10a, 309
 French 1, 3, 3a, 4a, 5a, 5b, 5c, 6, 10, 16
 Geology A, 100, 203, 400, 401
 German 1, 1a, 3, 3a, 4, 5, 6, 7, 8
 Government 1, 2, 3
 Greek 1a, 1b, 2a, 2b, 5
 History 1, 21, 61, 82-83 (in 1939-40 only)
 Italian 1, 14
 Latin A, 1a, 1, 3
 Mathematics 1, 2, 3, 5, 6, 15
 Music 1, 7, 8, 10, 20, 60
 Philosophy 1a, 1b, 2
 Physics 3, 4, 6, 11, 12
 Physiology 303

Public Speaking 30, 40
Spanish 1, 3, 4, 5, 6, 8
Zoology 1, 9

b. Subject to the permission mentioned in Section IV, NUMBER OF HOURS, required courses in other colleges in the regular freshman schedule of those colleges may be selected by a freshman in the College of Arts and Sciences, but only after the approval of the Dean of his College and of his adviser has been obtained.

c. Under exceptional circumstances, a freshman may by petition secure permission from the Advisory Board for Underclassmen to take courses (including freshman electives in other colleges) in addition to those allowed under a and b.

d. With the permission of the department concerned, a freshman at the end of the first term of a year-course may take a credit examination covering the work of the second term of the course also. This provision applies not only to year-courses but also to such second-term courses as are natural continuations of first-term courses (e.g. Physics 4, following Physics 3, French 4b following French 4a). The privilege is limited to students of high standing as defined by the department.

IV. NUMBER OF HOURS.

A freshman will ordinarily register for sixteen hours of work, including the one hour of Hygiene 1, in his first term.

Every student must register in each term for at least twelve hours; no student may register for more than eighteen hours in any term except by permission of the Dean. A student who has not attained in any academic year a grade of 70 or better in a total of fifteen hours of work will not be permitted to elect more than fifteen hours of work in either term of the subsequent academic year. A student on probation may not register for more than fifteen hours in the term of his probation unless he includes Hygiene 1 or 2 in his programme which may then total sixteen hours. For registration in a course not in the College of Arts and Sciences, the permission of the Dean of this College and of the Professor in charge of the course must be obtained.

ADVISERS

Freshmen and sophomores are under the jurisdiction of the Advisory Board for Underclassmen. Each freshman will be assigned to a member of the Faculty who will act as his adviser until he has selected his major adviser. (See page 15, MAJOR SUBJECTS a.) The function of the freshman adviser is to assist the student in his choice of studies, to advise him during the term regarding his work, and generally to give him friendly counsel. The approval of the study card and the signature of the adviser must be obtained before the study card is filed at the office of the Dean.

Special advisory committees have been set up to assist members of the College intending to teach in secondary schools and those intending to study medicine. Interested freshmen are urged to consult early with the proper chairman: for prospective teachers, Assistant Professor M. L. HULSE, Goldwin Smith 251; for pre-medical students, Assistant Professor V. S. LAWRENCE, JR., White 3.

MARKS AND SCHOLASTIC DISCIPLINE

The passing grade is 60; *abs* represents a course left incomplete by a student's absence from the final examination; *inc* represents a course left incomplete for other reasons acceptable to the instructor; *z*, a course dropped without official cancellation.

No credit towards graduation will be given for a course in which a mark of less than 60 or a mark of *z* is recorded, unless the course be repeated and a passing mark received. A student who has received a mark between 50 and 59, inclusive, in any course that is a prerequisite of any other course may, at the discretion of the department concerned, be regarded as having satisfied the prerequisite; or the department concerned may, before regarding him as having satisfied the prerequisite, require him, by re-examination or otherwise, to secure a passing grade.

A student who, in any course, has received a term mark of "incomplete" or of "absent" may, with the consent of the Dean, and upon payment of the fee required by the University, be permitted to remove the mark, by examination or otherwise, as the department concerned may direct. A mark of incomplete or of absent may not be removed later than registration day of the third term of attendance in the University, dating from the time the course was taken in class, and no more than one attempt at removal will be allowed.

A student who does not pass twelve hours in any term, with a grade of 70 or better in at least six of the twelve hours, will be either dropped or placed upon probation. The same penalties may be imposed on students of the College who, having registered in the Summer Session, do not pass four hours of their Summer Session registration with a grade of 70 or better in at least two hours.

A student's general record may be so unsatisfactory that the Faculty will refuse him permission to continue in the College even though he has passed twelve hours in the preceding term.

A student failing in the last term, or summer session, of his senior year to meet the requirements in hours and grades which is described above, will ordinarily be expected to return for another term, or summer session, wherein he will be held to make a satisfactory record before he will be graduated.

SCHOLARSHIPS

Scholarships open to students of Arts and Sciences as members of the University are listed in the *General Information Number* (see p. 36). Only students of Arts and Sciences are eligible for the four scholarships described below.

THE GEORGE C. BOLDT MEMORIAL SCHOLARSHIPS

Mr. George C. Boldt, jr., has created three scholarships, each of them worth four hundred dollars in 1940, as a memorial to his father. These scholarships will be awarded at the close of the junior year to the three male students of the College who shall be considered most deserving of this aid. Applications for these scholarships must be filed in the Office of the Dean before March 15 of the academic year preceding the year for which they are awarded. Students enrolled both in this College and in the Law School, the Medical College, or the Graduate School are not eligible.

THE CORNELIA L. HALL SCHOLARSHIP

A gift of the late Mary F. Hall has established the Cornelia L. Hall Scholarship, worth one hundred and twenty dollars, "open to any meritorious young woman of this State, who is pursuing the studies of the A.B. course and who is in need of financial assistance." Under the terms of the bequest preference must be given to a suitable candidate from Tioga, Tompkins, or Chemung County; within this preferred class, women of senior or junior standing will be regarded as entitled to first consideration. Applications for the scholarship must be filed in the Office of the Dean before March 15 of the academic year preceding the year for which it is awarded.

COURSES OF INSTRUCTION

ASTRONOMY

For a major in Astronomy the following courses must be completed: (1) in Astronomy, 180, 181, 186, 187, 189, and 190; (2) in related subjects, at least eighteen hours selected from Physics 60, 61, 105-170, and 571; Chemistry 102, 104, and 110; Mathematics 41, 42, and 85; Geology 100.

***180. Introduction to Astronomy.** First term. Credit three hours. Lectures and recitations. T Th 9. *Rockefeller* 322. One two-hour laboratory or observation period a week to be arranged. Dr. SHAW.

This course is designed to give the student an understanding of the fundamentals of Astronomy. Emphasis will be placed on the contributions of Astronomy to the sciences, philosophy and general culture. Ample opportunity for the observation of the heavenly bodies with the great telescope will be offered.

***181. Introduction to Astronomy.** Second term. Credit three hours. Prerequisites, Physics 3 and 4, or Astronomy 180. Lecture and recitation, T Th 9. *Rockefeller* 322. Laboratory hours to be arranged. Room 357. Dr. SHAW.

A continuation of course 180 with emphasis on the astronomy of the solar system, laboratory work dealing largely with observations of moon and planets and the orbits and motions of moon and planets.

182. Elements of Field Astronomy. Second term. Credit two hours. See Announcement of the College of Engineering.

183. Navigation and Nautical Astronomy. First term. Credit three hours. See Announcement of the College of Engineering.

[186. Geodetic Astronomy. Either term. Credit three hours. See Announcement of the College of Engineering. Not given in 1939-40.]

187. Advanced Astronomy. Throughout the year. Credit three hours a term. Prerequisite, Astronomy 181 or its equivalent. Hours to be arranged. Professor BOOTHROYD or Dr. SHAW.

The facts and principles underlying all branches of modern astronomy will be developed and discussed in detail.

[188. Geodesy. Throughout the year. Credit two hours a term.

See Announcement of the College of Engineering. Not given in 1939-40.]

189. Informal Study. Either term or throughout the year. Credit one to three hours. Professor BOOTHROYD and Dr. SHAW.

Investigation of special topics selected according to the needs and preparation of the student. Suggested topics include: history of astronomy, meteors, comets, origin of the solar system, variable stars, spectroscopic binaries, nebulae, mathematical astronomy. If the demand is sufficient, topics may be given formally.

190. Astrophysics. Throughout the year. Credit three hours a term. Prerequisites, Astronomy 187 and Mathematics 6 or their equivalents. Dr. SHAW.

A detailed study of present-day problems and progress in planetary, stellar, and nebular structure and constitution.

[191. Theoretical Astrophysics. Throughout the year. Credit three hours a term. Not given in 1939-40.]

See Graduate School Announcement.

195. Astrophysics Laboratory. Throughout the year. Credit variable.

See Graduate School Announcement.

[196. Problems in Practical Astronomy. Throughout the year. Credit three hours a term. Not given in 1939-40.]

See Graduate School Announcement.

197. Theoretical Astronomy. Either term or throughout the year. Credit three hours a term.

See Graduate School Announcement.

199. Advanced Study and Research. Either term or throughout the year. Credit variable.

See Graduate School Announcement.

BIBLIOLOGY

Bibliology 1 (Bibliography). First term. Credit two hours. The book as a source of information. The reference book; the handbook; book lists, general and special; catalogues and trade lists and their use. Open to upperclassmen. Professor KINKELDEY. T Th 12. *University Library.*

Bibliology 2. Second term. Credit two hours. The Book; its origin and evolution. Not a literary course, but a study of the book as a means of the conservation of thought, a manifestation of civilization and culture, its relation to the arts and crafts. Open to upperclassmen. Professor KINKELDEY. T Th 12. *University Library.*

BIOLOGY

For a major in the Animal Sciences there must be completed: (1) Zoology 1 and eighteen other hours chosen from Anatomy, Biochemistry, Embryology, Histology, Physiology, and Zoology; and (2) fifteen hours in related fields selected from Bacteriology, Botany, Chemistry, Entomology, Geology, Philosophy, Physics, Psychology, and the Social Sciences.

Students majoring in the field of Biological Sciences should have a reading knowledge of German and French.

Choice of all courses should be made at a conference with the adviser.

Students who are planning to study medicine should make sure that they select a major that will include the entrance requirements of the medical school of their choice. Information as to advisers and entrance requirements to medical schools may be obtained at the Office of Professor V. S. Lawrence, White Hall.

Provisions are made for a limited number of students to undertake informal study.

For a major in Biochemistry, the following courses must be completed: (1) in Biochemistry, courses 314, 314a, 320, 317, 317a; (2) in related subjects, Physiology 300 or 303, Chemistry 102 or 104, 210, 225, 375, and nine hours of electives.

For a major in Botany the following courses must be completed: (1) in Botany, courses 1, 31, 117, 123 or 124 or 126; one additional course of three or more hours credit; (2) in related subjects, eighteen hours selected from: any courses in Chemistry and Biochemistry; Physiology 300 and 301; Entomology 12, 15, 21; Zoology 1, 8, 11, 16; courses in Bacteriology approved by the Department of Botany; Plant Pathology 1; Geology A, 205 and any courses in Paleontology. The course in Genetics may be offered either as a course in Botany or in the related subjects.

For a major in Botany with advanced work in Bacteriology, the following courses must be completed: (1) in Botany, courses 1, 31, 117; in Bacteriology, eight hours of advanced courses approved by the Department of Botany; (2) in related subjects, eighteen hours to be selected from the list given in the paragraph above.

For a major in Entomology, the following courses must be completed: Entomology courses 12, 15a, 15b, 21a, 31 (three hours), Botany 1, Zoology 1; eight hours selected from the following five courses in Entomology, 31 (three hours), 21b, 21c, 51, 52, and fourteen additional hours selected from the following, including at least two hours from each of three of the five groups: (a) Zoology 8, 9, Geology 400; (b) Botany 117, Bacteriology 1; (c) Zoology 11, 16, Histology 101, Botany 124; (d) Physiology 300, 301, 303, 314, Botany 31; (e) Chemistry 305 and 310, or 375.

For other majors in Animal Biology, consult the advisers.

GENERAL BIOLOGY

***1. General Biology.** Throughout the year. Credit three hours a term. First term prerequisite to second. Lectures and demonstrations, M W F 9 or 11, *Roberts*, 392. One practice period a week. *Roberts* 301 and 302. Assistant Professor MOTTLEY, Dr. NEVIN, and assistants.

Not open to students who have had both Zoology and Botany 1. If Biology 1 is taken after either Zoology 1 or Botany 1, credit two hours a term.

An elementary course planned to meet the needs of students majoring outside of the plant and animal sciences; particularly adapted as the first year of a two-year sequence in biology for the prospective teacher of general science in the secondary schools. The course deals with the nature of life, life processes, the activities and origin of living

things. It covers the organization of representative plants and animals, including man as an organism, and the principles of nutrition, growth, behavior, reproduction, heredity, and evolution. Fee, \$3.50 a term.

5. Laboratory Methods in Animal Biology. Second term. Credit two hours. Prerequisite, Biology I or Zoology I and permission to register. Lecture and laboratory, F 10-12:30, and one period by appointment. Roberts 302. Dr. NEVIN and cooperating specialists.

For students who intend to teach or to follow some phase of zoology as a profession. This course includes such subjects as: laboratory equipment; collection, preservation and storage of materials; sectional and non-sectional preparations of animal tissues for histological study; injection of blood vessels and embalming; preparation of bird and mammal skins for study; chart-making; introduction to photography including the preparation of lantern slides; use of micro-projector; theory and use of 16 mm. sound and silent projection apparatus. Laboratory fee, \$5.

***100. The Conservation of Wild Life.** First term. Credit two hours. Professors ALLEN, HOSMER, WIEGAND, ADAMS, PALMER, A. H. WRIGHT, and Assistant Professors YOUNG, SUTTON, HAMILTON, and MOTLEY, Dr. KELLOGG, and cooperating specialists. Lectures, T Th 11 and occasional evenings, *Fernow 122*.

An introduction to the wild life resources of North America; the importance of the flora and fauna in our economic and cultural life; the history of its decimation, the present need for conservation, and the methods employed to reestablish the various species.

ZOOLOGY

***1. Introductory Zoology.** Throughout the year. Credit three hours a term. If taken after General Biology I, credit two hours a term. Assistant Professor YOUNG, Dr. A. G. MEKEEL, Messrs. CAMERON, GILBERT, INGRAM, and JACKSON. Lectures: T Th 9 or 11. Laboratory: M T W Th F 1:40-4; T W F 10-12:20; S 8-10:20. Lectures, *Goldwin Smith B. Laboratory, McGraw 102 and 104*.

An introduction to the animal sciences. The work of the first term deals with the fundamental structure and functions of a complex animal, together with some of the principles governing life in general. During the second term a survey of the animal kingdom is made through study of representatives of each of the principal phyla. Man's place in nature is finally considered. This course, or its equivalent, is a prerequisite to advanced work in the department. Fee, \$3 a term.

8. Elementary Taxonomy and Natural History of Vertebrates. Throughout the year. Credit three hours a term. Not open to freshmen. Professor WRIGHT, Assistant Professor HAMILTON, and Dr. RANEY. Lecture, M 8; Laboratory, M W 1:40-4 or T Th 1:40-4. *McGraw 7*.

Lectures on fishes, amphibians, reptiles, birds, and mammals, dealing with the principles of classification and nomenclature, characteristics, relationships, and bionomics of these groups. The laboratory gives practice in the identification of North American species. Field studies of the local fauna are undertaken during the fall and spring. Several all-day field trips are taken during the year. Laboratory fee, \$4.50 a term.

Students completing this course may arrange under Zoology 99 to pursue advanced work in the taxonomy of Vertebrates.

9. General Ornithology. Second term. Credit three hours. Lecture, W 11, *Fernow 122*. Field work and laboratory M W 1:40-4 or T Th 1:40-4, *Fernow 210*. Professor ALLEN, Dr. KELLOGG, and Mr. ———.

Introduction to the study of birds, particularly the local species; their songs and habits; designed to give a working knowledge to those wishing to study birds as an avocation, and fundamental to those planning advanced work in ornithology. Laboratory work with bird skins is based on the field work. Laboratory fee, \$3.

Students completing this course may arrange, under Zoology 99 to pursue advanced work during their junior and senior years.

11. Comparative Anatomy of Vertebrates. Throughout the year. Credit three hours a term. Prerequisite, Zoology I. Dr. SENNING, Messrs. GARRETT and BOURQUE. Lecture, Section I, M 9, Section II, M 10. *McGraw 203*. Laboratory, W F 8-10:30; M F 1:40-4; T Th 8-10:40; T Th 1:40-4; W 1:40-4, S 8-10:20. *McGraw 201*.

A thorough dissection and study of representative vertebrate types. The lectures are arranged to correlate and supplement the studies made in the laboratory.

16. **Invertebrate Zoology.** Throughout the year. Credit three hours a term. Prerequisite, Zoology 1 or its equivalent. Assistant Professor YOUNG and Mr. HEMING. Lecture, M 12, *McGraw* 203. Laboratory, T Th 1:40-4; W 1:40-4, S 8-10:20, *McGraw* 207.

A comprehensive consideration of the morphology, taxonomy, development, and phylogeny of the invertebrates. Laboratory fee, \$2.50.

[22. **Ichthyology, Advanced Systematic and Field Zoology.** Throughout the year. Credit three hours a term. Lectures, T Th 8. *McGraw* 7. Laboratory, S 8-10:30. Professor WRIGHT, Assistant Professor HAMILTON, and Dr. RANEY. Not given in 1939-40.]

An amplification of the prerequisite course 8.

[23. **Herpetology** (Amphibia). First term. Credit three hours. Professor WRIGHT, Assistant Professor HAMILTON, and Mr. TRAPIDO. Lectures, T Th 8. *McGraw* 7. Laboratory, F 1:40-4 or S 8-10:30.

An amplification of the prerequisite course 8. In the lectures special emphasis will be laid on the principal phases of animal life; the taxonomy, origin, and evolution of fossil and living groups; geographical distribution; and the literature and institutions of zoology. Laboratory periods will be devoted to the identification of exotic and indigenous forms. Not given in 1939-40.]

[24. **Herpetology** (Reptilia). Second term. Credit three hours. See Announcement for course 23. Professor WRIGHT, Assistant Professor HAMILTON, and Mr. TRAPIDO. Not given in 1939-40.]

25. **Mammalogy.** Throughout the year. Credit three hours a term. Professor WRIGHT and Assistant Professor HAMILTON. Lectures, T Th 8. *McGraw* 7. Laboratory, F 1:40-4 or S 8-10:30.

Discussion of principal phases of mammalian life: origin, distribution, habits, and literature. Laboratory periods are devoted to methods of field collecting, census taking, life history studies, preparation of skins and skeletons, and identification of North American species. Laboratory fee, \$3.

67. **Seminary in Systematic Vertebrate Zoology.** First and second terms. Credit one hour a term. Life zone plans of North America, 1817-1920. Distribution and origin of life in North America. Zoogeography of the Old World. Animal coloration. Other topics to be announced. Hours to be arranged. Professor A. H. WRIGHT.

99. **Zoological Problems.** An introduction to research. Throughout the year. Credit hours variable. Admission to the course is by consent of the instructor.

For qualified juniors and seniors. Opportunity is afforded for the pursuit of special problems designed to offer practice in the method of research.

126. **Advanced Ornithology.** First term. Credit three hours. Prerequisite, course 9. Professor ALLEN and Mr. ————. Lecture, W 11. Laboratory, T Th 1:40-4. *Fernow* 210.

The structure and classification of birds, geographical distribution; the literature and institutions of ornithology; identification of representative birds of the world. The first part of the term is devoted to field work on the fall migration, and the identification of birds in winter plumage. Designed primarily for students specializing in ornithology or animal biology. Laboratory fee, \$3.

136. **Seminar in Ornithology.** Throughout the year. M 7:30-9. Open to qualified undergraduates and required of all graduate students in Ornithology. Without credit. *Fernow Seminar Room.*

ANATOMY

221. **Structure of the Human Body.** Second term. Credit three hours. Prerequisite, six or more hours of Animal Biology and consent of the instructor. Professor PAPEZ and instructors. Lectures, M W F 11, and one demonstration at an hour to be arranged. *Anatomy Amphitheatre, Stimson.*

For students in the biological sciences and for others wishing to obtain a knowledge of the structure of their own bodies. Normal structures of the body, together with its variations and evolution based on developments in the individual and the race. Illustrated by specimens, lantern slides, and diagrams.

223. **Physical Anthropology and Human Evolution.** First term. Credit three hours. Prerequisite, Zoology or its equivalent. Professor PAPEZ and instructors. M W F 11.

Four parts: eras of vertebrate evolution, with special reference to the primates; prehistoric man; physical anthropology, and modern races and peoples.

224. Anatomy for Students of Art. Throughout the year. Given in alternate years. One lecture and three hours of laboratory a week. Hours to be arranged. Professor PAPEZ.

225. Comparative Neurology. Second term. Credit three hours. Prerequisite, six hours of Animal Biology. T Th 8-11. *Stimson* 52. Professor PAPEZ and instructors.

A comparative study of the vertebrate nervous system based on dissections of brains of shark and dog, and sections of cat brain stem; of the chief nerve systems and levels which determine the form and structure of the nervous systems, their evolution and functional significance.

226. Cerebral Mechanisms. Second term. Credit three hours. Prerequisite, course 225. Professor PAPEZ and instructors. M W F 9-11.

A course of study of the cerebral cortex of lower mammals and the primates with special reference to the subcortical connections and functional significance of the various cortical areas of the human brain. By consent of the instructor. Not given in 1939-40.]

250. Advanced and Research Work in Human Anatomy and Neurology. Throughout the year. Credit two or more hours a term. Professor PAPEZ. Hours to be arranged. *Stimson* 52.

The laboratories are open to those who have taken the necessary preliminary courses and are otherwise prepared. Primarily for graduates, and for undergraduates properly qualified.

HISTOLOGY

101. The Tissues: Histology and Histogenesis. First term. Credit four hours. Prerequisite, Zoology I or General Biology I. Professor ADELMANN, Instructor ———, and assistants. Lectures, T Th 11. *Stimson* 8; Laboratory, Section I, T Th 8-11; Section II, T Th 1:40-4. *Stimson* 39.

A general survey of the structure and development of the tissues. The treatment is general, designed to provide students of biology with a basis for the understanding of normal and abnormal structure of the vertebrate. Each student will prepare and receive a series of typical microscopic preparations.

102. The Organs: Histology and Development. Second term. Credit four hours. Prerequisite, course 101 or its equivalent. Professor KINGSBURY and assistants. Lectures, W F 10. *Stimson* 8; laboratory, W F 1:40-4. *Stimson* 39.

A continuation of course 101. Courses 101 and 102 together give the fundamental facts of the microscopic structure and development of the body. There is also offered opportunity to gain knowledge of technique in the fixing, embedding, and sectioning of selected organs.

104. Vertebrate Embryology. Second term. Credit five hours. Prerequisite, Biology I or Zoology I. Professor ADELMANN, Instructor ———, and assistants. Lectures, T Th 11 and lecture or conference, S 11, *Stimson* 8; Laboratory, Section I, T Th 8-11; Section II, T Th 1:40-4. *Stimson* 39.

An introduction to general vertebrate embryology designed to provide a basis for the appreciation of biological problems. The material is treated comparatively with particular emphasis on the development of the amphibian, the bird, and the mammal. A few invertebrate forms are used where desirable for illustration.

115. Experimental Embryology. First term. Credit two hours. Prerequisite, Course 104. Professor ADELMANN. For seniors and graduate students. The course will be conducted as a seminar. Lectures with reports by students dealing with the experimental analysis of development processes. Hours to be arranged. *Stimson*. Not given in 1939-40.]

PHYSIOLOGY

***303. Human Physiology.** Either term. Credit three hours. Assistant Professor DYE. Lectures, demonstrations, and discussion periods. M W F 10. *Stimson Amphitheatre*.

An introductory course designed particularly for those students who intend to take only one course in physiology, for those who expect to teach biology in the secondary schools, and for those who desire a general knowledge of the physiological processes of the human body.

305. Physiology of Metabolism, Endocrinology, and Reproduction. Second term. Credit three hours. Assistant Professor DYE. Lectures, M W 11. Laboratory, F 1:40-4. Prerequisite, six or more hours in biology. *Stimson*. Fee, \$5.

306. **Experimental Physiology.** Throughout the year. Hours to be arranged. Members of the staff. *Stimson*.

Advanced and graduate students may, with the consent of the instructor, arrange for discussions and laboratory exercises covering the following subjects: (1) digestion, absorption, utilization, excretion, heat regulation; (2) blood-lymph, circulation, respiration; (3) metabolism, endocrinology, reproduction; (4) nervous system.

308. **Research in Physiology.** Throughout the year. Hours to be arranged. Members of the staff. *Stimson*.

310. **Seminar in Physiology.** Second term. Credit one hour. Assistant Professor DYE. W 4:15. *Stimson Amphitheatre*.

For graduate students and others properly qualified. Reports on recent advances in physiology.

BIOCHEMISTRY

314. **Elementary Biochemistry.** First term. Credit three hours. Prerequisite, Chemistry 375 or the equivalent. Professor SUMNER, Dr. HOWELL, and Dr. DOUNCE. Lectures, M W 12; conferences, F 12. *Stimson* 4.

The substances met with in living things, and the chief facts of digestion, metabolism, and nutrition.

314a. **Laboratory Work in Biochemistry.** First term. Credit two hours. Prerequisite or parallel course, Animal Biology 314. Professor SUMNER, Dr. HOWELL, and Dr. DOUNCE. M W 1:40-4. *Stimson* 34.

325. **Advanced and Research Work in Biochemistry.** Throughout the year. Credit two or more hours. Prerequisite, Animal Biology 314 and 314a. Professor SUMNER. Hours to be arranged. *Stimson* 34.

For additional courses see the Announcement of the Graduate School.

ENTOMOLOGY

12. **General Entomology.** First term. Credit three hours. Prerequisite, General Biology 1, Zoology 1, or Botany 1. Lectures, W F 9. *Comstock* 245. Professor MATHESON. Practical exercises, T W Th or F 1:40-4, or S 8-10:30. *Comstock* 200. Professor MATHE-SON, Dr. TOWNES, and Mr. BELKIN.

Lectures on the characteristics of orders, suborders, and the more important families, and on the habits of representative species; practical exercises in studying the structure of insects, their biology, and their classification. The lectures only (two hours) may be taken by those who have had courses 15a and 21a. Laboratory fee, \$2.50.

15a, b, c. **Elementary Systematic Entomology.** (For details of hours and terms in which the work is given see courses 15, 30a, and 30b in Announcement of the Agricultural College.)

21. **Structure and Development of Insects.** (For details see the Announcement of the College of Agriculture.)

31. **Taxonomy of Insects.** Throughout the year. Credit three hours a term. Prerequisite, courses 12, 21a, and 15a and b. Lecture, W 10. *Comstock* 300. Laboratory, T Th 1:40-4. *Comstock* 300. Professor BRADLEY and Mr. PATE.

A survey of the classification of insects. The complete course occupies three consecutive terms, but the work of each may be taken independently. The orders treated will be: Fall of 1939, Lepidoptera, Coleoptera; Spring of 1940, Apterygota, Orthoptera, Diptera and small orders. Laboratory fee, \$4.50.

51. **Parasites and Parasitism.** Second term. Credit two hours. Prerequisite, General Biology 1 or Zoology 1. Lecture, M 9. *Comstock* 245. Practical exercises, M or T 1:40-4. *Comstock* 200. Professor MATHESON, Dr. TOWNES, and Mr. BELKIN.

A consideration of the origin and biological significance of parasitism, and of the structure, life, and economic relations of representative parasites. Laboratory fee, \$2.

52. **Medical Entomology.** Second term. Credit two hours. Prerequisite, Zoology 1 or General Biology 1. Lecture, T 9. *Comstock* 245. Practical exercises, W or Th 1:40-4. *Comstock* 200. Professor MATHESON, Dr. TOWNES, and Mr. BELKIN.

This course deals with insects and other arthropods that are the causative agents of disease in man and animals, or are the vectors, or intermediate hosts, of disease-producing organisms. Laboratory fee, \$2.

70. **Insect Ecology.** (For details see the Announcement of the College of Agriculture.)

132. Classification of Aquatic Insects. (See Announcement of the College of Agriculture.)

171. Limnology. Second term. Credit three hours. Prerequisites, Botany I; Zoology I, 8, 16; Entomology 12, 132. Certain of the prerequisites may be waived by permission of the instructor. Assistant Professor MOTTLEY. Lecture, Th 11. *Comstock* 145. Laboratory, F 1:40-4, S one period by appointment.

An introduction to the study of the relations between aquatic organisms and their environment. A laboratory and field course. Laboratory fee, \$5.

172. Advanced Limnology. First term. Credit three hours. Prerequisite, course 171. Lecture, Th 11. *Comstock* 145. Laboratory, F 1:40-4, S one period by appointment. *Comstock* 110. Dr. MOTTLEY.

A qualitative and quantitative treatment of the problem of the productivity of inland waters. Laboratory fee, \$7.50.

BOTANY

***1. General Botany.** Throughout the year. Credit three hours a term; both terms of the course must be completed to obtain credit, unless the student is excused by the department. If taken after General Biology I, credit two hours a term. Professor PETRY, Dr. PALMQUIST, Mr. BANKS, Dr. WILLIAMS, and assistants. Lectures, T Th 9 or 11. *Plant Science* 233. Laboratory, one period of two and one-half hours. *Plant Science* 240, 242 and 262.

A survey of the fundamental facts and principles of plant life. The work of the first term deals with the structures and functions of the higher plants, with special emphasis on their nutrition. The work of the second term traces the evolution of the plant kingdom, as illustrated by representatives of the principal groups, and concludes with a brief introduction to the principles of classification of the flowering plants. Laboratory fee, \$3.50 a term.

13. Trees and Shrubs. First term. Credit four hours. Prerequisite, course I or its equivalent. Professor MUENSCHER and Mr. BANKS. Lecture, T Th 8. *Plant Science* 143. Laboratory or field work, M W or T Th 1:40-4. *Plant Science* 211.

The identification of trees and shrubs, in summer and in winter conditions. During the first part of the term the work covering identification is done largely in the field. The work of the latter part of the term is a study of the taxonomy of woody plants. Laboratory fee, \$4.

102. Nonvascular Plants. First term. Credit four hours. Prerequisite, course I or its equivalent. Lectures, T Th 9. *Plant Science* 336. Laboratory, T Th 10-12:30. *Plant Science* 228. Dr. PALMQUIST.

A consideration of the morphology, phylogeny, and classification of the nonvascular plants, with practice in their identification. Special attention will be given to a study of local forms in the field. Laboratory fee, \$5.

31. Plant Physiology. First or second term. Credit four hours. Prerequisite, course I and introductory chemistry. Professor KNUDSON, or Professor O. F. CURTIS, Assistant Professor HOPKINS, Dr. CLARK, and O. F. CURTIS, jr. Lectures, T Th 10. *Plant Science* 233. Laboratory, T Th 1:40-4 or W F 1:40-4. *Plant Science* 227.

This course is designed to acquaint the student with the general principles of plant physiology. Topics such as water relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, growth, and reproduction are studied in detail. In both laboratory and recitations emphasis is placed on discussion of the principles taught and their applications. Laboratory fee, \$4; deposit, \$3.

115. Aquatic Plants. Second term. Credit three hours. Prerequisite, course I or its equivalent. Lecture, T 9. *Plant Science* 353. Laboratory, M W 1:40-4. *Plant Science* 353. Professor MUENSCHER.

A study of the taxonomy and ecology of fresh water plants, beginning with the algae and concluding with the aquatic angiosperms. Laboratory fee, \$4.

117. Taxonomy of Vascular Plants. Second term. Credit four hours. Prerequisite, course I or its equivalent. Professor WIEGAND. Lecture, M 9. *Plant Science* 143. Laboratory, M W F 1:40-4. *Plant Science* 211.

A study of the kinds of seed plants and ferns, their classification into genera, families, and orders, and field work on the local flora. Emphasis is placed on wild plants, but the more common cultivated plants receive some attention. The course is planned to follow course I and to furnish an introduction to the knowledge of field botany and classifica-

tion of the higher plants, in preparation for special work in various departments, and as an aid in teaching. Instruction is given in the preparation of an herbarium and of keys. Laboratory fee, \$4; deposit, \$5.

Students completing this course may arrange, under course 145, to pursue special advanced work in taxonomy.

101. Genetics. First term. Credit four hours. (Given in the Department of Plant Breeding.) Professor FRASER and Dr. DORSEY. Lectures, M W F 8. *Plant Science* 233. Laboratory, M T W or F 1:40-4.

121. Comparative Morphology of Fungi. First term. Credit four hours. (Given in the Department of Plant Pathology.) Prerequisite, Botany 1. Lectures, M W 9. Laboratory M W 2-4:30. *Plant Science* 333. Professor FITZPATRICK. Given in alternate years.

A synoptical course designed to introduce the beginner to the general field of mycology.

123. Plant Anatomy. Second term. Credit four hours. Prerequisite, course 1 or its equivalent, and permission to register. Lecture and conference, T 9. *Plant Science* 141. Laboratory, T 10-12:30; Th 9-11:30. *Plant Science* 228. Professor EAMES.

This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material. The course is planned primarily for students in applied fields of botany, such as pathology, pomology, or genetics. Students desiring a less detailed training in this subject should take course 126. Laboratory fee, \$5.

124. Cytology. First term. Credit four hours. Prerequisite, course 1 or Zoology 1 or its equivalent. Professor L. W. SHARP. Lectures, M W 9. *Plant Science* 233. Laboratory, M W or T Th 10-12:30 or T Th 1:40-4. *Plant Science* 219. Assignment to laboratory section must be made at the time of registration.

The principal topics considered are protoplasm, cells and their components, nuclear and cell division, meiosis and fertilization, and the relation of these to the problems of development, reproduction, and heredity. Both plant and animal materials are used. Microtechnique is not included. Laboratory fee, \$5.

125. Microtechnical and Microscopical Methods. Second term. Credit five hours. Prerequisite, permission to register. Lectures and demonstrations, T Th 11-1. *Plant Science* 211. Three laboratory periods to be arranged to suit the class. *Plant Science* 219. Dr. DETOMASI.

A course for advanced students who require training in the preparation of plant and animal materials for histological or cytological study and desire a foundation in the field of microscopy as applied to biological problems. Laboratory fee, \$10. Additional supplies for special individual work to be paid for by the students.

[126. Morphology of Vascular Plants. Second term. Credit three hours. Professor EAMES. Lectures, T 9. *Plant Science* 141. Laboratory, T 10-12:30, Th 9-11:30. *Plant Science* 228. Prerequisite, courses 1 and 102 or their equivalent, and permission to register.

An advanced course in the comparative morphology, life histories, and phylogeny of vascular plants. Laboratory fee, \$5. Not given in 1939-40.]

[161. History of Botany. Second term, without credit. Hour to be arranged.

A course of lectures given by various members of the staff with the purpose of acquainting advanced students of botany with the historical development of their science. Not given in 1939-40.]

171. Special Problems in General Botany, Taxonomy, Morphology, Anatomy, Economic Botany, Paleobotany, Cytology, and Physiology. Throughout the year. Credit not less than two hours a term. By appointment. Professors WIEGAND, KNUDSON, EAMES, L. W. SHARP, O. F. CURTIS, PETRY, RANDOLPH, and MUENSCHER, Assistant Professor HOPKINS, Dr. CLARK and Dr. PALMQUIST.

Students engaged in special problems or making special studies may register in this course. They must satisfy the instructor under whom the work is taken that their preparation warrants their choice of problem. The laboratory fee depends on the nature of the work and on the number of credit hours.

219. Advanced Taxonomy of Vascular Plants. Second term. Credit two hours. Prerequisite, course 117 or its equivalent. Open only to major students in Botany and graduate students. Professor WIEGAND. Hours to be arranged. *Plant Science* 211.

Special round-table discussion of topics of particular interest to the taxonomist. One hour is devoted to practical work on some group of plants.

[224. **Advanced Cytology.** Second term. Credit two hours. Prerequisites, course 124, Plant Breeding 101, and permission to register. Professor L. W. SHARP. Lecture, W 9. *Plant Science* 141. Laboratory and seminar to be arranged. *Plant Science* 228.

An advanced course dealing largely with the physical basis of heredity and with recent researches in cytogenetics. Not given in 1939-40.]

231. **Plant Physiology, Advanced lecture course.** Throughout the year. Credit three hours a term. Prerequisite, training in botany and chemistry, to be determined in each case by the department. Limited to seniors and graduate students. Professor KNUDSON and O. F. CURTIS. Lectures, M W F 10. *Plant Science* 143.

232. **Plant Physiology, Advanced laboratory course.** Throughout the year. Credit three hours a term. Prerequisite or parallel course, 231. Professors KNUDSON, O. F. CURTIS, Assistant Professor HOPKINS, and Dr. CLARK. Laboratory, M 1:40-4, S 8-12:30. *Plant Science* 241. Laboratory fee, each term, \$10; breakage deposit, \$5.

For other courses in Botany see the Announcement of the College of Agriculture.

BACTERIOLOGY

For courses in this subject, see the Announcements of the Colleges of Agriculture and Veterinary Medicine. These courses may be counted as part of the thirty hours which the student may elect outside the College of Arts and Sciences. For a major in Botany with advanced work in Bacteriology, see the statement of major requirements in Botany.

CHEMISTRY

All courses listed below are to be given in the Baker Laboratory of Chemistry.

For a major in Chemistry, the following courses must be completed: (1) in Chemistry, courses 102 or 104, 205 and 206, or 210; or preferably 110, 115, and 203; 220 and 221, or 225; 305, 310 (first term); 406, 410 (one term); and six hours of electives; (2) and related subjects, Mathematics 5a and 5b, or 6a, 6b, and 6c, Physics 3 and 4 or 3 and 6, German 1 or 1a unless two units have been offered for entrance.

INORGANIC CHEMISTRY

Students exceptionally well prepared in chemistry should read section 6, P. 12 and 13, in regard to College Credit Examination.

Examinations for those who were unavoidably absent from the final examination in Courses 102 and 104 will be held at 2 p. m. on the day before instruction begins in the fall.

*102. **General Chemistry.** Throughout the year. Credit three hours a term. Both terms of the course must be completed to obtain credit unless the student is excused by the department. Open only to those students who do not offer entrance chemistry. Deposit, \$11 each term. Professor BROWNE, Professor LAUBENGAYER, and assistants. Lecture: Th or F 11, *Main Lecture Room, Baker*. Recitation: one hour a week, to be arranged. Laboratory: M T W Th or F 1:40-4.

This course deals with the fundamental laws and theories of chemistry and the properties of the more common elements and their compounds.

*104. **General Chemistry.** Throughout the year. Credit three hours a term. Both terms of the course must be completed to obtain credit unless the student is excused by the department. Prerequisite, entrance credit in chemistry. Deposit, \$11 each term. Professor PAPISH and assistants. Lecture: M or T 11, *Main Lecture Room, Baker*. Recitation: one hour a week, to be arranged. Laboratory: M T W Th or F 1:40-4.

This course deals with the fundamental laws and theories of chemistry and the properties of the more common elements and their compounds.

*110. **Introductory Inorganic Chemistry.** Throughout the year. Credit three hours first term, two hours second term. Prerequisite, entrance credit in chemistry, or course 101. Required of candidates for the degree of Chemical Engineer, and candidates for the degree of A.B. who intend to major in Chemistry.

Lectures: Professor LAUBENGAYER. First term, M W F 9; second term, W F 9. *Baker* 107.

*115. **Introductory Inorganic Chemistry.** Recitations and laboratory practice. First term. Credit three hours. Must be taken with the first term of Chemistry 110. Deposit, \$20. Professor LAUBENGAYER and assistants.

Recitations: one hour a week, to be arranged.

Laboratory: W 1:40-4. S 8-10:30. *Baker* 50.

130. Advanced Inorganic Chemistry. Throughout the year. Credit three hours a term. Prerequisite or parallel courses, Chemistry 405 and 410. Professor LAUBENGAYER. M W F 11. *Baker* 107.

The elements are discussed in the order in which they appear in the Periodic System, with special attention to the bearing of atomic structure on the properties of elements and their compounds and on the relations between the group. The less familiar elements are treated in detail and the stereochemistry of inorganic substances is considered.

135. Advanced Inorganic Chemistry. Either term. Credit two to six hours. Prerequisite, Chemistry 305 and 310. Fee variable. Professor BROWNE, Professor LAUBENGAYER, and assistants. Day and hour to be arranged, *Baker* 178 and 122.

Laboratory practice. The preparation, purification, properties, and reactions of inorganic compounds including those of the rarer elements.

Chemistry 135 is designed to accompany Chemistry 130, but either course may be taken separately.

140. Selected Topics in Advanced Inorganic Chemistry. Second term. Credit two hours. Prerequisite, Chemistry 405 and 410, or special permission. Professor BROWNE. W F 9. *Baker* 107. Given in alternate years.

160. Chemistry of the Rare Elements. Throughout the year. Credit two hours. Prerequisite, first term of Chemistry 130, or special permission. Professor PAPISH. T Th 9. *Baker* 302.

Lectures. Occurrence, distribution, and associations of the rare elements; chemical reactions of the rare elements and of their salts, including analytical reactions.

165. Chemistry of the Rare Elements. Second term. Credit two or more hours. Prerequisite or parallel course Chemistry 160. Fee variable. Professor PAPISH and assistant. Hours to be arranged. *Baker* 318.

Laboratory practice. Extraction, recovery, and purification of the rare elements, and preparation of their salts. Chemical analysis of the rare elements.

195. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professors BROWNE, PAPISH, and LAUBENGAYER.

ANALYTICAL CHEMISTRY

***201. Introductory Analytical Chemistry.** First term. Credit four hours. Prerequisite, Chemistry 102 or 104. Deposit, \$25. Primarily for students majoring in the biological sciences. Professor NICHOLS and assistants. Lectures: T Th 10. *Baker* 177.

Laboratory sections: M W F 1:40-4; S 8-1. *Baker* 252.

A study of the fundamental principles of qualitative and quantitative analysis. Laboratory practice in gravimetric and volumetric quantitative methods.

***203. Introductory Qualitative Analysis.** Second term. Credit five hours. Prerequisite, Chemistry 115 and one term of Chemistry 110, or special permission. Deposit, \$30. Must be taken with the second term of Chemistry 110. Required of candidates for the degree of Chemical Engineer and open to candidates for the degree of A.B. who intend to major in Chemistry. Dr. LONG and assistants.

Lecture: M 8. *Baker* 177. One recitation, to be arranged.

Laboratory: M W F 1:40-4; or T Th 1:40-4, S 8-10:30. *Baker* 50.

***205. Introductory Qualitative Analysis.** First term. Credit three hours. Prerequisite, Chemistry 102 or 104. Must be taken with Course 206. Dr. LONG and assistants. Lecture: M W 9. *Baker* 22.

Recitation: F 9. *Baker* 22.

A study of the application of the theories of general chemistry to the systematic separation and detection of the common elements and acid radicals.

***206. Introductory Qualitative Analysis.** First term. Credit three hours. Prerequisite, Chemistry 102 or 104. Deposit, \$25. Must be taken with Course 205. Dr. LONG and assistants.

Laboratory section: M W F 1:40-4. *Baker* 50.

Laboratory practice. A study of the properties and reactions of the common elements and acid radicals; the qualitative analysis of a number of solutions and solid compounds.

***210. Introductory Qualitative Analysis.** Shorter course. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 102 or 104. Deposit, \$20. Dr. LONG and assistants.

Lecture: W 12. First term, *Baker* 200; second term, *Baker* 207.

Laboratory sections: T Th 8-10:30; T Th 1:40-4 (first term only). *Baker* 50.

A study of the properties and reactions of the common elements and acid radicals, and their detection in various solutions.

***220. Introductory Quantitative Analysis.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206. Must be taken with Course 221. Professor NICHOLS, Dr. MACMILLAN, and assistants.

Lectures: T Th 9. *Baker 207.* One recitation, to be arranged.

A study of the fundamental principles of gravimetric and volumetric analysis with practice in stoichiometry.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 221 instead of Course 225.

***221. Introductory Quantitative Analysis.** Repeated in the second term. Credit three hours. Prerequisite, Chemistry 203, or 205 and 206. Must be taken with Course 220. Deposit, \$20. Professor NICHOLS, Dr. MACMILLAN, and assistants.

Laboratory sections: F 1:40-4, S 8-1; T Th 10-12:30, Th 1:40-4 (first term only). *Baker 252.*

Laboratory practice in the preparation and standardization of various volumetric solutions and the analysis of a variety of substances by volumetric and gravimetric methods.

Students in science are advised, and candidates for the degree of Bachelor of Chemistry are required, to take this course together with Course 220 instead of Course 225.

***225. Introductory Quantitative Analysis.** Shorter course. Repeated in the second term. Credit three hours. Prerequisite Chemistry 210. Deposit, \$20. Dr. MACMILLAN, and assistants.

Lecture: Th 12. First term. *Baker 207*; second term, *Baker 200.*

Laboratory sections: T Th 8-10:30; W F 1:40-4; T Th 1:40-4. *Baker 252.*

A study of the fundamental principles of gravimetric and volumetric analysis, and the analysis of various substances by these methods.

230. Advanced Quantitative Analysis. Repeated in the second term. Credit three hours. Prerequisite, Chemistry 220 and 221 or special permission. Deposit, \$20. Professor NICHOLS, Dr. MACMILLAN, and assistants. Recitations: one hour a week, to be arranged. Laboratory periods: first term. T Th 1:40-4; T Th 8-12:30; S 8-1; second term, T Th 1:40-4; T Th 8-12:30. *Baker 294.*

Students will be assigned to a combination of laboratory periods that will total seven and one-half hours a week.

The calibration of weights and volumetric apparatus; the analysis of ferrous and non-ferrous alloys, silicates, and organic substances by various gravimetric, volumetric, and combustion methods.

[235. **Advanced Quantitative Analysis.** Second term. Credit two hours. Prerequisite, first term of Chemistry 405. Professor NICHOLS. M W 12. *Baker 207.*

A discussion of selected topics in quantitative analysis, and the development and present status of various analytical methods. Given in alternate years; not in 1939-40.]

250. Gas and Fuel Analysis. Second term. Credit three hours. Prerequisite, Chemistry 220 and 221. Fee, \$10. Professor NICHOLS and assistants.

Lectures: F 10. *Baker 207.*

Laboratory sections: M W 1:40-4; T 10-12:30; 1:40-4; Th 10-12:30, 1:40-4; S 8-1. *Baker 282.*

The complete analysis of coal gas, flue gas, and air, the determination of the heating power of gaseous, liquid, and solid fuels; the analysis of coal; standard methods of testing various petroleum and coal-tar products; the analysis of various substances by methods involving the use of different types of gas evolution apparatus. Problems are assigned which afford practice in the calculation and interpretation of results.

[270. **Special Methods of Quantitative Analysis.** Either term. Credit two or more hours. Prerequisite, Chemistry 230 and 405. Fee variable. Professor NICHOLS, Dr. MACMILLAN, and assistants. Day and hour to be arranged. *Baker 277.*

Laboratory practice in the application of special methods such as indirect analysis, conductometric and potentiometric titrations, etc., to quantitative analysis and the analysis of special materials. Electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, zinc, iron, etc.; the analysis of alloys and ores. The study of the important methods and special forms of apparatus used in scientific gas analysis.

Within certain limits the work may be selected to suit the requirements of the individual student. Not given in 1939-40.]

[275. **Quantitative Microanalysis.** First term. Credit three or more hours. Prerequisite, Chemistry 230 and special permission. Fee, \$20. Professor NICHOLS. Day and hour to be arranged. *Baker* 282.

Laboratory practice in typical methods of both organic and inorganic quantitative microanalysis. Not given in 1939-40.]

280. **Emission Spectroscopy in Chemical Analysis.** First term. Credit three hours. Prerequisite, Chemistry 225 or 220, and Physics 21 and 22, or by special permission. Fee, \$15. Professor PAPISH and assistant. Laboratory hours to be arranged. *Baker* 396. Conference, hour to be arranged.

The construction and use of spectroscopic equipment; spectrum excitation; qualitative and quantitative spectrochemical analysis.

295. **Research for Seniors.** Throughout the year. Credit two or more hours a term. Fee variable. Professors NICHOLS and PAPISH, Drs. LONG and MACMILLAN.

535. **Microscopic Qualitative Analysis (Inorganic).** Either term. Credit two or more hours. Prerequisite, Chemistry 530. Fee, \$5. Professor MASON and assistants. Laboratory periods, to be arranged. *Baker* 378.

Laboratory practice in the examination and analysis of inorganic substances containing the more common elements with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

ORGANIC CHEMISTRY

305. **Introductory Organic Chemistry.** Throughout the year. Credit six hours on completion of the course. Prerequisite, qualitative analysis. Open to those who are taking Course 220. Professor JOHNSON and Dr. MILLER. M W F 9. *Baker* 200.

Lectures and written reviews. The more important compounds of carbon, their occurrence, methods of preparation, relations, and uses.

Students who have completed Chemistry 375 may register for Chemistry 305 in the second term and receive two hours credit.

310. **Introductory Organic Chemistry.** Throughout the year. Credit three hours a term. Prerequisite or parallel course, Chemistry 305. Deposit, \$35. Professor JOHNSON, Dr. MILLER, and assistants. Laboratory sections, T Th 10-12:30, Th 1:40-4; F 1:40-4, S 8-1. *Baker* 250.

Laboratory practice and oral reviews. The student prepares a large number of typical compounds of carbon and familiarizes himself with their properties, reactions, and relations.

315. **Advanced Organic Chemistry.** Throughout the year. Credit two hours a term. Prerequisite, Chemistry 305, 310, and 340, or the consent of the instructor. Professor JOHNSON, Assistant Professor BRUCE, and Dr. MILLER. T Th 9. *Baker* 177.

Lectures. First term, survey of the more important classes of organic compounds and their reactions. Second term, discussion of general topics (tautomerism, molecular rearrangements, stereochemistry). Students may register for either term separately.

320. **Advanced Organic Chemistry.** Either term. Credit two to six hours a term. Prerequisite, Chemistry 305 and 310. Fee variable. Assistant Professor BRUCE, Dr. MILLER, and assistants. Day and hour to be arranged. Conference, F 12. *Baker* 206, *Baker* 208.

Laboratory practice. An advanced course in the preparation of organic compounds. The original literature is consulted, and the student is required to repeat some extended and important piece of work, and to compare his results with those published.

325. **Special Topics in Organic Chemistry.** Throughout the year. Credit two hours. Prerequisite, Chemistry 315 or 340, or the consent of the instructor. First term, M W 11, *Baker* 207. Second term, T 4:15. *Baker* 204. Professor JOHNSON, Assistant Professor BRUCE, and Dr. MILLER. M W 11. *Baker* 207.

Lectures. A presentation and discussion of special fields and current theories of organic chemistry. For 1938-39, the topics will be: first term, Heterocyclic Compounds; second term, Survey of Special Synthetic Methods (including industrial processes); for 1939-40: first term, Physical Aspects of Organic Chemistry; second term, Organic Chemistry of Natural Products (Plant and Animal Pigments, Vitamins, Hormones).

340. **Identification of Organic Compounds.** Second term. Credit four hours. Prerequisite, Chemistry 305 and 310. Deposit, \$20. Dr. MILLER and assistants. Lectures and conferences, T Th 10. *Baker* 206. Three laboratory periods, M T W or Th 1:40-4. *Baker* 350. With the permission of the instructor, students may register for three hours credit (two laboratory periods).

The classification reactions of organic compounds and the preparation of solid derivatives are applied to the identification of unknown organic substances.

375. Elementary Organic Chemistry. Either term. Lectures and laboratory, six hours credit. For students in the pre-medical and biological curricula. Prerequisite, general chemistry; qualitative analysis is desirable but not required. Deposit, \$20. Assistant Professor BRUCE, Dr. MILLER, and assistants.

Lectures: First term, M W F S 9; second term, M W F S 11. *Baker 207.*

Laboratory Sections: First term, M W 10-12:30; M W 1:40-4; T Th 1:40-4. Second term, M W 1:40-4; T Th 8-10:30. *Baker 250.*

The student should determine the entrance requirement in Organic Chemistry for the particular medical school he wishes to enter. If more than six hours credit is required, he should register in Chemistry 305 and 310. Students may obtain 9 hours credit by taking Chemistry 305 throughout the year (6 hours) and Chemistry 310 (3 hours) during the first term.

By special permission students may register for five hours credit, with only one laboratory period a week: T or Th 8-10:30. Deposit, \$15.

395. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor JOHNSON, Assistant Professor BRUCE, and Dr. MILLER.

Students are advised to complete Chemistry 340 before registering in this course.

540. Microscopical Methods in Organic Chemistry. Second term. Credit two or more hours. Prerequisite, Chemistry 530, and special permission. Fee, \$5. Professor MASON and assistants. Day and hour to be arranged. *Baker 378.*

Laboratory practice. General manipulative methods applicable to small amounts of material, crystallization procedures, determination of melting points and molecular weights; chemical tests and reactions for elements, radicals, and various types of organic compounds. Preparation of simple derivatives.

PHYSICAL CHEMISTRY

[401. **Principles of Physical Chemistry.** Throughout the year. Lectures and laboratory. Primarily for students in the biological sciences. Credit three hours a term. Prerequisite, Chemistry 375 and Physics 3 and 4 or 7 and 8. Deposit, \$15. Assistant Professor HOARD, and assistants. Lectures: *Baker 7.* T Th 9. Laboratory: M T Th or F 1:40-4. *Baker 1.* Not given in 1939-40.]

405. Introductory Physical Chemistry. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 305, Mathematics 5a and 5b and Physics 11 and 12 (or their substantial equivalent). Professor BRIGGS and assistants. Lectures, M W F 9. *Baker 7.*

A systematic presentation of modern physical chemistry. The topics include: the properties of gases, liquids, and solids; physical and chemical equilibrium in homogeneous and heterogeneous systems; the Mass Law, theorem of Le Chatelier, and the Phase Rule; thermochemistry and elementary thermodynamics; the theory of solutions; ionic equilibria and the concept of activity; chemical kinetics and catalysis; photochemistry; written problems in physical chemistry.

406. Physical Chemistry. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 305, which may be taken simultaneously; Mathematics 6a, 6b, and 6c or 5a and 5b; Physics 3 and 4 (or 6), or 11 and 12. Required of candidates for the degree of A.B. majoring in chemistry and open to other qualified students by permission. Assistant Professor HOARD. Lectures and recitations, M W F 10. *Baker 22.*

A study of the more fundamental principles of physical chemistry from the standpoint of the laws of thermodynamics, and of the kinetic theory. A unified treatment of the properties of matter, thermochemistry, the properties of solutions, and of equilibrium in homogeneous and heterogeneous systems. Chemical kinetics and catalysis are included.

410. Introductory Physical Chemistry. Throughout the year. Laboratory and recitations. Credit three hours a term. Prerequisite or parallel course, Chemistry 405. Deposit, \$20. Professor BRIGGS, Assistant Professor HOARD, Mr. ———, and assistants. Laboratory sections: M T 1:40-4; Th F 1:40-4; and S 8-1. *Baker 1.* Recitations to be arranged.

Qualitative and quantitative experiments illustrating the principles of physical chemistry and practice in performing typical physico-chemical measurements. Recitations on the general principles of physical chemistry, based upon the lectures given in Course 405.

420. Advanced Physical Chemistry. First term. Credit three hours. Prerequisite, Chemistry 405. Required of candidates for the degree of Bachelor of Chemistry. Assistant Professor HOARD. Lectures and recitations, M W F 12. *Baker 7.*

Exposition of the principles of physical chemistry from the mathematical standpoint, with emphasis on the solution of simple problems.

[425. Applications of the Phase Rule. First term. Credit two hours. Prerequisite, Chemistry 405. Professor BRIGGS. Lectures: T Th 11. *Baker 7.*

The study and interpretation of typical phase diagrams in systems of one, two, three, and four components. Special attention will be paid to equilibria in saturated salt solutions and to the problem of indirect analysis. Given in alternate years; not in 1939-40.]

430. Colloid Chemistry. Throughout the year. Credit two hours a term. Open to candidates for the degree of Bachelor of Chemistry if they have completed Chemistry 405, to others only by special permission. Professor BRIGGS. T Th 10. *Baker 7.*

Lectures. The theory of colloid chemistry and its application in the arts. Given in alternate years.

[435. Chemistry of Solids. First term. Credit three hours. Prerequisite or parallel courses, Chemistry 405 and 530 or 545 or special permission. Hours to be arranged. Professor MASON and Assistant Professor HOARD. *Baker —.*

A general discussion of the formation and growth of metallic and chemical crystals, their physical and chemical behavior, and the relationships between lattice structure and chemical constitution. Given in alternate years; not in 1939-40.]

440. Molecular Structure. Second term. Credit three hours. Open to qualified students by permission. Assistant Professor HOARD. Hours to be arranged. Given in alternate years.

Discussion of our present knowledge of molecular structure as derived from studies of crystal structure, molecular and Raman spectra, electron diffraction, and dipole moments. Some attention is given to the theoretical background of the methods. Applications of structural data in other fields are indicated.

445. Introductory Electrochemistry. Second term. Lectures, informal recitations, and laboratory. Credit three hours. Prerequisite, Chemistry 405. Deposit, \$15. Professor BRIGGS and assistants. Lectures: M W 12. *Baker 7.* Laboratory: T W Th or F 1:40-4. *Baker 1A.*

Theory of electrolysis and the voltaic cell, including the theory and practice of determining transference numbers, the activities of ions, oxidation-reduction potentials, solubility by electrometric methods, and similar subjects.

[450. Applied Electrochemistry. First term. Credit three hours. Prerequisite, Chemistry 445. Professor BRIGGS. M W 11. *Baker 7.*

Lectures. The electrolytic refining and extraction of metals; the electrolytic manufacture of organic and inorganic compounds; the theory and practice of storage cells, the electric furnace. Given in alternate years; not in 1939-40.]

By taking Course 465 (2 or more hours), the student may supplement this course with laboratory practice dealing with the various topics presented in the lectures. The experiments include the measurement and study of decomposition voltages; current and energy efficiencies in electrolysis; the deposition of metals; the preparation of chemical compounds by electrolysis; and the testing of storage cells.

455. Kinetics of Chemical Reactions. Second term. Credit two hours. Prerequisite, Chemistry 405. Dr. LONG. Hours to be arranged.

A general discussion of rates of reactions including: types of reactions, methods of measurement, theories of reaction rates, application to problems.

465. Advanced Laboratory Practice in Physical Chemistry. Either term. Credit variable, but not to exceed six hours a term. Prerequisite, determined in each case by the Professor in charge. Fee variable. Professors BRIGGS, KIRKWOOD, and HOARD, and assistants. Hour and place to be arranged.

470. Thermodynamics. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 405 and 420, or special permission. Professor KIRKWOOD. M W F 9. *Baker 18.*

Development of the general equations of thermodynamics from the first and second laws. Exposition of the concepts of entropy and free energy. Applications to the study of physico-chemical equilibria in gases, liquids, solids, and liquid solutions. Problems.

475. Theory of Solutions. First term. Credit three hours. Prerequisite, Chemistry 470. Professor KIRKWOOD. M W F 12.

Exposition of modern theories of electrolyte and non-electrolyte solutions. Presentation of the Debye-Hückel theory and the calculation of the thermodynamic functions of

electrolyte solutions from inter-ionic forces. The Bjerrum theory of ion association. Correlation of the properties of non-electrolyte solutions with molecular distribution and intermolecular forces. Discussion of transport phenomena in solution including electrolytic conductance, diffusion, and viscous flow. Given in alternate years.

480. Statistical Mechanics. Second term. Credit three hours. Prerequisite, first term Chemistry 470. Professor KIRKWOOD. M W F 12.

Exposition of the equilibrium theory of statistical mechanics from the standpoint of the Gibbs canonical ensemble. Mechanical interpretation of the principles of thermodynamics, with application to simple thermodynamic systems. Given in alternate years.

490. Introductory Quantum Mechanics with Chemical Applications. Second term. Credit three hours. Open to qualified students by permission. Professor KIRKWOOD. Hours to be arranged.

Elementary presentation of the principles of quantum mechanics. The basic ideas underlying the quantum mechanical theory of the chemical bond. Given in alternate years.

495. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professors BRIGGS and KIRKWOOD and Assistant Professor HOARD.

530. Introductory Chemical Microscopy. Repeated in the second term. Credit three hours. Prerequisite, or parallel courses, Chemistry 405 and Physics 21 and 22, or special permission. Fee, \$5. Professor MASON and assistants.

Lecture: M 10. *Baker 377.*

Laboratory sections: M T 1:40-4; T Th 9-11:30. *Baker 378.*

Lectures and laboratory practice. The use of microscopes and their accessories in chemical and technical investigations. Micrometry; quantitative estimations; microscopical characteristics and physical chemistry of crystals; illumination, ultra-microscopy and photomicrography; study of industrial materials such as textile and paper fibers.

Graduate students are advised to take this course the first term.

545. Introductory Metallography. First term. Credit three hours. Prerequisite or parallel course, Chemistry 405, or Engineering 3X31. Fee, \$10. Professor MASON and assistant. Th F 1:40-4; additional M T 1:40-4 section if warranted. *Baker 384.* Conference or lecture, Th 10.

Laboratory practice, conferences, and reports. An introduction to the principles and methods involved in the study of the structure of metals. The relation of microscopical appearances to phase diagrams, thermal history, and mechanical properties. Preparation of specimens for macroscopic and microscopic study. Metallographic microscopes and their use.

550. Advanced Metallography. Second term. Lectures, credit two hours. Laboratory optional, credit one or more hours. Prerequisite, Chemistry 545 and consent of the instructor. Laboratory fee variable. Professor MASON. *Baker 377 and 384.*

Lectures, conferences, and reports on various topics in physical metallurgy. Laboratory work, arranged in accordance with the interests of the student, covering heat treatment and structures of ferrous or non-ferrous alloys, or minor research problems.

565. Special Methods in Chemical Microscopy. Either term. Credit one or more hours. Prerequisite, special permission. Fee variable. Professor MASON. Day and hour to be arranged. *Baker 378 and 382.*

Laboratory practice may be elected in various fields such as photomicrography, ultra-microscopy, crystal studies, micro-manipulations, quantitative determinations, and the microscopy of industrial materials such as pigments, textiles, papers, and foods.

595. Research for Seniors. Throughout the year. Credit two or more hours a term. Fee variable. Professor MASON.

CHEMICAL ENGINEERING AND INDUSTRIAL CHEMISTRY

705. Unit Operations of Chemical Engineering. Throughout the year. Credit three hours a term. Prerequisite, Chemistry 405. Professor RHODES. M W F 10. *Baker 177.*

Lectures. A critical discussion of the important unit operations of chemical engineering: fluid flow, heat transfer, evaporation, distillation, filtration, gas absorption, crushing and grinding, etc. In these lectures, particular emphasis is placed on the fundamental theory upon which the various unit operations are based.

710. Unit Operations Laboratory. Throughout the year. Credit two hours a term. Prerequisite, Chemistry 405. Fee, \$10. Professor RHODES, Assistant Professor WINDING, and assistants. Laboratory period, day and hour to be arranged. *Baker B-78.* Conference period, Th 11. *Baker 207.*

The study in the laboratory, on a semi-plant scale, of the unit operations of chemical engineering, such as agitation, and mixing, filtration, fractional distillation, evaporation, drying, absorption of gases, and heat transfer.

For other courses in Chemical Engineering and Industrial Chemistry, see the Announcement of the College of Engineering.

SPECIAL TOPICS

910. Special Topics in Chemistry. First term. Credit one hour. Required of candidates for the degree of Bachelor of Chemistry. Professors RHODES and MASON. T 11. *Baker 207.*

The use of chemical literature; methods of research; administration of chemical laboratories; patent law; and other special topics.

1000. Non-Resident Lectures on the George Fisher Baker Foundation. Credit two hours. T Th 12. *Baker 177.* Open to seniors in the course in Chemistry, and to juniors on special permission.

THE CLASSICS

Those whose major study is in the Classics must complete twenty hours of non-starred courses in the Department, and fifteen hours, selected after conference with the adviser, in related subjects. Related subjects for this purpose are Ancient History, the Comparative Study of Literature, modern foreign languages, particularly French and German, and Ancient Philosophy.

ARCHAEOLOGY, ANCIENT ART

1. History of Painting and Sculpture. Throughout the year. Credit three hours a term. First term: Ancient and Mediaeval; Assistant Professor WAAGÉ. Second term: Renaissance and Modern; Professor FINLAYSON. For registration, see under Fine Arts 1. Only the first term's work will count for credit in Classics.

2. History of Greek Sculpture. First term. Credit three hours. Assistant Professor WAAGÉ. M W F 10. *Goldwin Smith Museum of Casts.* (See Fine Arts 2.)

3. Arts of the Roman Empire. Second term. Credit three hours. Assistant Professor WAAGÉ. M W F 10. *Goldwin Smith Museum of Casts.* (See Fine Arts 3.)

4. Ancient Art. Second term. Credit three hours. Assistant Professor WAAGÉ. M W F 11. *Goldwin Smith Museum of Casts.* (See Fine Arts 4.)

The history of pre-Greek and non-Greek art in the Mediterranean region from the Old Stone Age to the end of the Persian Empire. Sculpture, painting, and the minor arts will be studied.

[5. Ancient Painting and Mosaic. Second term. Credit three hours. Assistant Professor WAAGÉ. M W F 11. *Goldwin Smith Museum of Casts.* Not given in 1939-40.]

6. History of Coins. First term. Credit two or three hours. Assistant Professor WAAGÉ. Hours to be arranged. *Goldwin Smith 35.* Open to students whose major work is in the Classics or History, and to other students by special permission.

The coins will be treated as material for the study of the history of the Mediterranean states from the sixth century B.C. to the Byzantine Empire, with reference to the politics, economics, and art of the period. The students will work with coins from the University collection.

7. Problems in Archaeology. Second term. Credit two or three hours. Assistant Professor WAAGÉ. Hours to be arranged. *Goldwin Smith 35.* Open to students whose major work is in the Classics, and to other students by special permission.

GREEK

*1a. **Greek for Beginners.** Introduction to Homer's Iliad. Repeated in second term. Credit three hours. Professor CAPLAN. M W F 12. *Goldwin Smith 124.*

*1b. **Homer's Iliad.** Continuation of Greek 1a. Repeated in second term. Credit three hours. Prerequisite, Greek 1a. Professor HUTTON. M W F 12. *Goldwin Smith 120.*

*2a. **Attic Greek. Plato: Selected Dialogues.** Repeated in second term. Credit three hours. Prerequisite Greek 1b. Dr. GREENE. T Th S 9. *Goldwin Smith 124.*

*2b. **Euripides: Iphigenia in Tauris, and Alcestis; New Testament: Selections.** Repeated in second term. Credit three hours. Prerequisite, Greek 2a. Professor JONES. T Th S 10. *Goldwin Smith 120.*

5. **Greek Composition.** Throughout the year. Credit one hour. Prerequisite, Greek 1b or its equivalent. Professor JONES. T 2. *Goldwin Smith* 124.

*7. **Greek Myths.** Illustrated lectures. First term. Credit two hours. Professor JONES. Open to sophomores and upperclassmen who have had a year of Greek, Latin, or Ancient History. T Th 12. *Goldwin Smith* 120.

[*8. **Lectures on Ancient Greece and Greek Life.** Second term. Credit two hours. Professor JONES. Open to sophomores and upperclassmen who have had a year of Greek, Latin, or Ancient History. Not given in 1939-40.]

17. **Aristophanes: Clouds; Sophocles: Oedipus Rex, Antigone.** Throughout the year. Credit three hours a term. Prerequisite, Greek 2b. Professor JONES. T Th S 11. *Goldwin Smith* 124.

20. **Lyric Poetry; Aeschylus: Prometheus Vincit; Theocritus; Demosthenes: Philippics.** Throughout the year. Credit three hours a term. Prerequisite, Greek 17. Professor JONES. T Th S 11. *Goldwin Smith* 124.

[22. **Plato: the Republic; Pindar: Selected Odes; Thucydides.** Throughout the year. Credit three hours a term. Prerequisite, Greek 20. For graduates and qualified undergraduates. Not given in 1939-40.]

25. **Advanced Greek Composition.** Throughout the year. Credit one hour a term. Prerequisite, Greek 5. Professor JONES. Th 2. *Goldwin Smith* 124.

[30. **Lectures on Greek Literature.** Not given in 1939-40.]

LATIN

Prospective teachers of foreign languages in the secondary schools whose interest is primarily in Latin will ordinarily choose Latin as their major subject. For these students, the requirements will be courses 16, 17, 21, 26, with prerequisites, and in addition such courses in Latin, and in related subjects in Classics and in other departments, as may be determined after conference with the adviser.

For those who desire to teach Latin in addition to another foreign language which has been chosen as a major subject, the minimum requirements in Latin will be courses 16, 17, 21, 26, with prerequisites.

The most frequent combination of foreign languages for secondary teachers at the present time is Latin and French, and for this combination the departments concerned have arranged a special schedule of required and recommended courses which will satisfy the requirement of each language as a major subject.

The required courses in Education should be begun in the sophomore year.

*A. **Freshman Course: For Students Offering Two Units of Entrance Latin.** Throughout the year. Credit three hours a term. Professor DURHAM. M W F 9. *Goldwin Smith* 128. Cicero: Selected Orations; Virgil: Aeneid.

*1a. **Freshman Course: For Students Offering Three Units of Entrance Latin.** Throughout the year. Credit three hours a term. Section 1, M W F 10. Professor HUTTON. *Goldwin Smith* 120. Section 2, T Th S 10. Dr. GREENE. *Goldwin Smith* 128. Ovid; Virgil; Horace: Odes and Epodes.

*1. **Freshman Course: For Students Offering Four Units of Entrance Latin.** Throughout the year. Credit three hours a term. Section 1, M W F 10. Professor DURHAM. *Goldwin Smith* 128. Section 2, M W F 11. Professor CAPLAN. *Goldwin Smith* 124. Cicero: De Senectute; Martial: Epigrams; Horace: Odes and Epodes.

*3. **Sight Translation.** Throughout the year. Credit one hour a term. Dr. GREENE. Section 1, Th 12. *Goldwin Smith* 124. Section 2, Th 11. *Goldwin Smith* 128.

*8. **Terence; Catullus; Horace: Satires and Epistles; Virgil: Georgics; Livy.** Throughout the year. Credit three hours a term. Prerequisite, Latin 1a or 1. M W F 10. First term, Dr. GREENE; second term, Professor HUTTON. *Goldwin Smith* 124.

11. **Republican Poetry to Lucretius; and a Survey of Post-Augustan Literature.** Open to those who have taken or are taking course 8 or course 16. Professor DURHAM. Second term. Two hours credit. T Th 12. *Goldwin Smith* 128.

[12. **Lyric Poetry.** Prerequisite, Latin 1 or 1a. Primarily for those who have taken or are taking course 8. Professor DURHAM. Not given in 1939-40.]

[16. **The Greater Republican Writers.** Throughout the year. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Plautus; Cicero, Lucretius. Not given in 1939-40.]

17. **Literature and History of the Early Empire.** Throughout the year. Credit three hours a term. Prerequisites, Latin 8, 11, or 12. Tacitus; Annals; Juvenal; Pliny's Letters; Suetonius. Professor CAPLAN. M W F 9. *Goldwin Smith* 124.

21. **Latin Writing, Elementary Course.** Throughout the year. Credit one hour a term. Prerequisite, Latin I or 1a. Dr. GREENE. W 2. *Goldwin Smith* 124.

26. **Teachers' Training Course.** First term. Credit two hours. This course along with Education 4 and 4a will satisfy the requirement in Methods of the N. Y. State Provisional Professional Certificate. Professor DURHAM. T Th 12. *Goldwin Smith* 128.

[27. **Topography and Architectural Remains of Rome.** First term. Credit two hours. Not given in 1939-40.]

[33. **Classical and Mediaeval Rhetoric.** Professor CAPLAN. Not given in 1939-40.]

45. **Latin Writing, Advanced Course.** Throughout the year. Credit one hour a term. First term, Professor HUTTON; second term, Dr. GREENE. M 2. *Goldwin Smith* 124. For graduates, and for undergraduates who have taken Latin 21.

[48. **Vulgar Latin: Petronius: Cena Trimalchionis; Vulgar Latin Inscriptions, including Christian Inscriptions.** Second term. Credit two hours. Professor DURHAM. Primarily for juniors and seniors. Not given in 1939-40.]

49. **Indo-European Philology; Sounds and Flexions of Latin; Italic Dialects.** Professor DURHAM. First term. Credit two hours. M W 12. *Goldwin Smith* 128.

[50. **Latin Epigraphy.** First term. Credit two hours. Professor DURHAM. Primarily for juniors and seniors. Not given in 1939-40.]

For graduate courses, see Announcement of the Graduate School.

COMPARATIVE STUDY OF LITERATURE

For major work in the Comparative Study of Literature the following courses must be completed; (1) in the Comparative Study of Literature, a minimum of twelve hours in courses selected from 27, 28, 103b, 104, 105, and 106, to which may be added nine other hours in unstarred courses in English to be selected with the consent of an adviser; (2) in related subjects, a minimum of twenty-four hours selected from courses in Greek, Latin, Ancient and Mediaeval History, Ancient and Mediaeval Philosophy, and, when the minimum of twelve hours mentioned above is adhered to, English (but not starred courses in English). With the authorization of an adviser in English, these requirements may be interpreted and adjusted in such fashion as to fulfil the requirements for major work in English.

[27. **Modern Writers on Art: Tolstoy, Nietzsche, and Ruskin.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen with the permission of the instructor. Not given in 1939-40; to be given in 1940-41.]

28. **English Translations of Greek and Latin Classics.** Throughout the year. Credit three hours a term. Open to sophomores and upperclassmen. Professor COOPER. T Th 10 and conferences. *Goldwin Smith* 127.

Rapid reading in the best translations, with emphasis upon Greek masterpieces; for example, the Iliad and the Odyssey, the tragedies of Sophocles, and several dialogues of Plato. Translations from the Latin will be chosen for the bearing of the original works upon modern literature. Students wishing to take the course must consult the instructor in advance.

[103a. **Old English.** First term. Credit three hours a term. Open to sophomores and upperclassmen, and to graduate students by special permission. Professor COOPER. Not given in 1939-40; to be given in 1940-41.]

103b. **Middle English.** Second term. Credit three hours a term. Open to sophomores and upperclassmen, and to graduate students by special permission. Professor COOPER. M W F 10. *Goldwin Smith* 127.

A study of the foundations of the English language and literature, with emphasis upon the chief writers of the fourteenth century, especially Chaucer, and upon their relations to Blake, Wordsworth, Kipling, and others. Some attention is paid to literary species, and to earlier and later translations of the Bible.

104. **Principles of Literary Criticism.** Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. W 11-12:50. *Goldwin Smith* 127.

A study of the chief theories of poetry, and chief kinds of literature, with illustrations drawn from writers both ancient and modern.

This and course 106 are mainly designed for prospective college and university teachers.

105. General Reading. First term. Credit three hours. Primarily for upperclassmen; open to sophomores by special permission. All who wish to take the course should consult the instructor in advance since the class must be limited to seventy students. Professor COOPER. M W F 10. *Goldwin Smith* 156.

For those who wish to form now, and later, a library of the best books. Hints for a journal, to be kept by the student, of his current reading, and plans for reading; a thread to be supplied by some main author, in English or in available English translations, conjointly with a few main English poets. Reading aloud by the instructor and invited readers.

106. Dante in English. Throughout the year. Credit three hours a term. Primarily for graduate students; open to upperclassmen by permission. Professor COOPER. M 11-12:50. *Goldwin Smith* 127.

Readings for the sake of literary and historical perspective, followed by a study of the Divine Comedy in the best English translations.

ECONOMICS

For a major in Economics the following courses must be completed: (1) in Economics, course 1, or 2a and 2b, or the equivalent; twenty-four hours of advanced courses, including six in each of three groups; (2) in related subjects, fifteen hours in the following Departments: (a) History (in addition to the six hours in Prescribed Subjects); (b) Government (except courses 1, 2, 3); (c) Sociology; (d) Philosophy (except courses 1, 2, 3); (e) Psychology (except course 1); (f) Mathematics (except courses 1, 2, 3); (g) Geology 205. Of these fifteen hours, twelve must be in not more than two departments.

Students registered for a major in Economics prior to September 1939 who have completed courses in the former Social Science group may count these courses as part of the major requirement. Members of the class of 1940 may count six hours in Sociology as part of the twenty-four required hours in Economics.

Certain courses in Agricultural Economics may be counted in partial fulfillment of the major requirements in Economics, but in no case may more than six of the required twenty-four hours be allowed for such courses.

Students who intend to register in Arts and Sciences and in the Law School will be required to complete twelve hours of advanced courses in Economics, of which six must be in one group, and nine hours of related courses (see paragraph 1 above) of which six must be in one department.

INTRODUCTORY COURSES

*1. **Modern Economic Society.** Repeated in second term. Credit five hours. Not open to freshmen. Professor O'LEARY. Daily except S 8, 9, 10, 11, 12.

A survey of the existing economic order, its more salient and basic characteristics, and its operation.

In the first term, the enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days at *Goldwin Smith* 260.

*2a. **Modern Economic Society.** First term. Credit three hours. Not open to freshmen. Professor O'LEARY. M W F 8, 9, 10, 11; T Th S 8, 9, 11.

This course and course 2b cover the same subject matter as course 1.

Enrollment will be limited. Students should register, if possible, on the first day of registration. Assignment to sections will be made on registration days in *Goldwin Smith* 260.

*2b. **Modern Economic Society.** Second term. Credit three hours. Prerequisite course 2a. Professor O'LEARY. M W F 8, 9, 10, 11; T Th S 8, 9, 11.

*3. **Introduction to Economics.** For students in Engineering and Chemistry. Repeated in second term. Credit three hours. Professor O'LEARY. Hours to be announced.

An introduction to the more essential economic features of contemporary American society.

FINANCE

11. **Money and Banking.** Repeated in second term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Professor REED. M W F 9. *Goldwin Smith* C.

An introductory study of the history and theory of money, followed by brief discussions of banking operations and banking institutions.

Enrollment limited.

[12. **Central Banking and Monetary Policy.** Second term. Credit three hours. Prerequisite, Economics 11. Professor REED. M W F 11. *Goldwin Smith* 142.

Problems of credit management with particular reference to the operations of the Federal Reserve Banks. The main theme will be treated in such a way that some attention can be devoted to problems of bank administration. Not given in 1939-40.]

13. **Financial History of the United States.** Second term. Credit three hours. Prerequisite, Economics 11. Professor O'LEARY. T Th S 10. *Goldwin Smith* 142.

A study of developing financial institutions, problems, and legislation from 1700 to 1900. Monetary, banking, and public finance problems will be dealt with against the changing background of American economic organization.

15. **Trade Fluctuations.** First term. Credit three hours. Prerequisite, Economics 11. Professor REED. M W F 11. *Goldwin Smith* 142.

A study of the causes and effects of trade recessions and revivals, with an introduction to the methods of general forecasting.

16. **Money and Credit.** First term. Primarily for graduate students. Professor REED.

ACCOUNTING

21a. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics 1 or its equivalent. May, with permission of instructor, be taken by students registered for course 2b. Professor ENGLISH. T Th S 8. *Goldwin Smith* 142. One practice period. T or W 2-4. *Goldwin Smith* 329.

Theory of debit and credit; the journal and ledger; the development of books of original entry; analysis of income statements and balance sheets.

21b. **Accounting.** Repeated in second term. Credit three hours. Prerequisite, Economics 21a. Professor ENGLISH. M W F 8. *Goldwin Smith* 256.

The issue and transfer of capital stock, bonds and their valuation, depreciation, reserves and reserve funds, sinking funds, analysis of income statements and balance sheets.

26. **Accounting Theory and Problems.** Throughout the year. Credit two hours a term. Prerequisite, Economics 21b, or its equivalent. Professor ENGLISH. T Th 10. *Goldwin Smith* 329.

A critical study of the fundamental principles underlying accounting procedure. The solution of typical problems in corporate consolidation, reorganization, and liquidation, and in other special fields.

ORGANIZATION AND CONTROL OF INDUSTRY

31. **Corporation Finance.** Repeated in second term. Credit three hours. Prerequisite, Economics 21a. Professor O'LEARY. M W F 9. *Goldwin Smith* 142.

A study of the financial practices of business corporations in the United States. Types of corporate securities, the exchange of such securities for capital funds, determination and administration of corporate incomes, financial difficulties and corporate reorganization, and the relation of corporate practices to the functioning of the American economic system.

32a. **Public Control of Business.** First term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Professor HOMAN. T Th S 10. *Goldwin Smith* 264.

An examination of the economic and legal foundations of public control, with special reference to the anti-trust laws and public utility regulation.

32b. **Public Control of Business.** Second term. Credit three hours. Prerequisite, course 32a or the consent of the instructor. Professor HOMAN. T Th S 10. *Goldwin Smith* 264.

A continuation of course 32a with special reference to recent developments in the field of public control.

Fee, in lieu of textbook, \$2.

34. **Transportation.** First term. Credit three hours. Open to upperclassmen who have credit for Economics 21a. Professor O'LEARY. T Th S 9. *Goldwin Smith* 256.

Public policy concerning methods of organization and administration of transportation.

36. Taxation. Second term. Credit three hours. Open to juniors and seniors who have credit for Economics 1 or its equivalent. Assistant Professor KENDRICK. M W F 11. *Warren Hall 25.*

A study of the principles and practices of public finance with emphasis on taxation. Among the topics examined are: The growth of public expenditure; the changing pattern of federal, state, and local taxation; general property, personal income, inheritance, business, commodity, and motor vehicle taxation; the incidence of taxation; relations among taxing units; and the problems of developing a system of taxation.

Fee for materials furnished, \$2.

38. Control of Industry. Throughout the year. Primarily for graduate students. Professor O'LEARY.

LABOR AND INDUSTRIAL RELATIONS

41. Labor Conditions and Problems. First term. Credit three hours. Prerequisite, Economics 1 or its equivalent. Professor MONTGOMERY. M W F 10. *Goldwin Smith 142.*

An introduction to the field of Labor Economics and a survey of the more basic labor problems growing out of modern economic arrangements.

42. Trade Unionism and Collective Bargaining. Second term. Credit three hours. Prerequisite, Economics 41 or the consent of the instructor. Professor MONTGOMERY. M W F 10. *Goldwin Smith 142.*

A study of the origins, philosophic basis, aims, and policies of trade unions, of the economic implications of trade unionism in modern economic life, and of collective bargaining in selected industries.

43. Quantitative Measurements of Economic Phenomena. First term. Credit two hours. Consult the instructor before registering. Professor MONTGOMERY. M 2-4. *Goldwin Smith 256.*

A critical survey of the attempts that have been made to apply quantitative methods to the measurement of economic phenomena, with special reference to the labor field. Among the topics treated: estimates of the size and distribution of the national income; problems of measuring the trend of real earnings and of physical production; cost of living index numbers; attempts to apply inductive, statistical, and quasimathematical methods to the theory of value and distribution; budgetary studies and measurement of standards of living; unemployment statistics. Not given in 1939-40.]

44. Labor Management Policies and Methods. Second term. Credit two hours. Prerequisite, Economics 41 or consent of the instructor. Professor MONTGOMERY. T Th 10. *Goldwin Smith 256.*

An analysis of the problems of labor management, particularly in the light of changing government policies toward labor and industry. Among the specific topics: environmental determinants and historical evolution of employment policies; public policy bases of government regulation of industrial relations policies; joint relations with employees; organization and functions of personnel departments; selection and training of workers; job analysis and specification; wage policies and methods of remuneration; indirect financial incentives, labor turnover, and regularization of employment.

45. The Economics of Dissent. First term. Credit three hours. Open to upperclassmen with the consent of the instructor. Professor MONTGOMERY. W 2-4 and an hour to be arranged. *Goldwin Smith 264.*

A study of the literature of social protest; of unorthodox or dissenting economic doctrines; and of the various types of economic organization that have been proposed or attempted, including the Utopias, Marxian Socialism, Collectivism, Anarchism, the Single Tax, Syndicalism, Guild Socialism, Fabian Socialism, Communism and Fascism.

46. Legal and Constitutional Aspects of Labor Problems and Social Insurance. Second term. Credit two hours. Consult the instructor before registering. Professor MONTGOMERY. W 2-4. *Goldwin Smith 264.*

A study of the legal aspects of trade union objectives and methods and of the theory and practical operation of the more important types of social insurance. Among the topics treated: legal theories underlying labor law; statutory enactments affecting trade unions; injunctions, damage suits, criminal prosecutions, restrictions upon employers; conciliation, arbitration, mediation, unemployment insurance, health insurance, workmen's compensation, old age pensions, the legal minimum wage, the Federal Social Security Act.

[47. **European Labor Movements, Conditions, and Government Policies.** Not given in 1939-40.]

49. **Special Studies in Industrial Relations.** Studies in wage theory, international aspects of industrial relations, and other special topics. Second term. Credit two hours. Professor MONTGOMERY. Room and hours to be arranged. Primarily for graduate students.

INTERNATIONAL TRADE AND FINANCE

71. **International Trade and Commercial Policy.** First term. Credit three hours. Prerequisite, Economics I or its equivalent. Assistant Professor SOUTHARD. T Th S 11. *Goldwin Smith 142.*

A survey of the foreign trade of the United States; the international balance of payments and the concept of reciprocity; international commercial policy, with special reference to the tariff policy of the United States; the theory of international trade.

72. **International Finance.** Second term. Credit three hours. Prerequisite, Economics 71 or 11. Assistant Professor SOUTHARD. T Th S 11. *Goldwin Smith 142.*

A study of foreign exchange under varying monetary standards, of exchange control and stabilization, and of the transfer problem and the mechanism of international adjustment.

[74. **International Economic Organization.** Second term. Credit three hours. Prerequisite, Economics 71 or the consent of the instructor. Assistant Professor SOUTHARD. Not given in 1939-40.]

ECONOMIC THEORY

81. **Economics of Enterprise.** First term. Credit three hours. Primarily for seniors majoring in Economics. Assistant Professor KENDRICK. M W F 10. *Goldwin Smith 264.*

A course in economic theory with emphasis on the price aspect of the economic order. Among the topics treated are: the nature and meaning of the economic process; the relation of that process to social welfare; the significance of cost of production; distribution; the rent of land; interest, and the problem of combining the factors of production.

82. **The Distribution of Income.** Second term. Credit three hours. Prerequisite, Economics I or its equivalent. Professor HOMAN. T Th S 9. *Goldwin Smith 264.*

An analysis of the economic processes of distribution, together with a study of income statistics and an analysis of the effects upon incomes of certain actual and proposed measures of public economic control.

85. **Economic Theory.** Throughout the year. Primarily for graduate students. Professor HOMAN.

INTERDEPARTMENTAL SEMINARY

100. **Utilitarianism.** Throughout the year. Credit three hours a term. A seminar conducted by members of the departments of Economics, Government, History, Philosophy, and Sociology and Anthropology. Registration by permission, and limited to seniors majoring in the departments concerned. Hours to be arranged.

The background and development of Utilitarianism and the reaction against it, studied from the points of view of economics, government, history, and philosophy. Seminary discussions of assigned readings.

EDUCATION

For a major in Education (which must comprise at least thirty-six hours), the following courses must be completed: (1) in Education, eighteen hours including courses 1, 2, and 3 or 13; (2) in related subjects fifteen hours selected according to the student's interests and needs from Philosophy, Psychology, Rural Education, teachers' courses in other departments, Physiology 303 and 307, Economics 50a, 50b, 51, 54, and 55, and Mathematics 10. A final comprehensive examination is required.

Students wishing to secure certificates for teaching in secondary schools should consult the Announcement of the Graduate School of Education.

A new five-year program for the preparation of secondary school teachers has been authorized. Students interested should consult the Announcement of the Graduate School of Education.

1. **Educational Psychology.** Either term. Credit three hours. Not open to freshmen. Lectures and recitations. Dr. WHITE. First term, M W F 11. *Goldwin Smith* 156; second term, M W F 10. *Goldwin Smith* 234.

A study of functional psychology with special reference to the learning process and its application to educational theory and practice.

2. **Principles of Secondary Education.** Either term. Not open to sophomores. Credit three hours. Prerequisite, Education 1. First term. Professor JORDAN. M W F 2. Second term. Professor JORDAN. T Th S 9. *Goldwin Smith* 234.

The nature and significance of education; biological and psychological foundations; the secondary school as a social institution; educational ideas and values; the curriculum.

[**History of Education.** (a) (Greek, Roman, and Early Medieval.) First term. Credit two hours. Open to upperclassmen and graduates only. Professor LAISTNER. (See History 7.) (b) (Late Medieval and Modern.) Second term. Credit two hours. Open to upperclassmen and graduates only. Professor SMITH. (See History 36.) Not given in 1939-40.]

4. **Methods, Practice, and Extra-Instructional Problems.** Credit nine hours. Assistant Professor HULSE in charge. For teachers of academic subjects.

For detailed information consult the Announcement of the Graduate School of Education. The nine hours offered under course 4 must be counted among the thirty hours allowed outside the College of Arts and Sciences (see 14).

[5. **Theory of Education.** Second term. Credit two hours. For seniors and graduate students. Prerequisite, Education 1 or the equivalent. Professor OGDEN. Not given in 1939-40.]

7. **Mental Measurements.** First term. Credit three hours. By permission of the instructor, candidates for the principal's certificate may enroll for two hours credit. Prerequisite, Education 1 or equivalent. Dr. WHITE. T Th S 9. *Goldwin Smith* 225.

The nature of intelligence. History of the development of individual and group tests of intelligence; principles underlying their construction and application; the use of tests of intelligence in school problems, with atypical children, and in fields outside the school. Use of educational tests. Demonstrations in administering tests.

[8. **Experimental Education.** Either term. Credit and hours to be arranged. Consent of the instructor is required. Education 7 or its equivalent should normally precede this course. Professor FREEMAN. Not given in 1939-40.]

Problems of experimental education; the application of psychological and statistical methods to problems in educational psychology; chief results and bearings.

10. **High School Administration.** Second term. Credit two hours. For seniors, graduates, and other qualified students. Professor JORDAN. W F 3. *Goldwin Smith* 236.

Principles relevant to administration of the senior and junior high school; classification of pupils; program making; curriculum problems; the principal as supervisor; pupil guidance; duties of the principal in both large and small high schools.

11. **Extra-classroom Activities.** First term. Credit two hours. For seniors and graduates. Professor JORDAN. M 4-6. *Goldwin Smith* 236.

A study of the place extra-classroom activities should assume in the school program. General principles involved, with special attention given to athletics, dramatics, publications, school finance, music, debate, and school clubs.

12. **The Junior High School.** First term. Credit three hours. For seniors, graduates, and other qualified students. Professor JORDAN. M W F 9. *Goldwin Smith* 248.

Psychological, biological, and pedagogical bases for the Junior High School; fundamental principles; organization and administration; curricular content in detail; methods of instruction.

13. **History of American Education.** First term. Credit three hours. Prerequisite, Education 1 or its equivalent. Assistant Professor HULSE. T Th S 10. *Goldwin Smith* 236.

A survey of educational change in the United States from the beginning of the seventeenth century to the present, with special emphasis on public schools, and consideration of the religious, economic, political, and social factors affecting education. European influences throughout the period will also be considered briefly.

16. **Readings in the History of Education.** Second term. Credit two hours. Consent of instructor is required. Assistant Professor HULSE. Hours to be arranged. *Goldwin Smith* 251.

An advanced course, emphasizing the historic changes in aims and methods.

[17. **Mental Development.** First term. Credit two hours. Prerequisite, Education 1 or its equivalent. Professor FREEMAN. Not given in 1939-40.]

18. **Individual Differences.** Second term. Credit three hours. Prerequisite, Education 1 or its equivalent. It is desirable, though not required, that Education 7 precede this course. Dr. WHITE. M 2-4, and a third hour to be arranged. *Goldwin Smith* 236.

The nature, causes, and implications of individual differences in abilities, interests, and achievement. Study and observation of atypical and problem groups.

[20. **Seminar in Education.** First term. Credit two hours. Primarily for graduate students; open to upperclassmen by permission. Professor FREEMAN. Th 4-6. *Goldwin Smith* 248. Not given in 1939-40.]

Topics relevant to educational theory.

21. **Seminar in Education.** Second term. Credit two hours. Admission by permission of the instructor. Professor JORDAN. M 4-6. *Goldwin Smith* 248.

Topics developing from historical and current problems of educational practice, especially as related to administration and conduct of the public school system and of the university. Primarily for graduate students.

The attention of the student is called to the Announcement of the Graduate School of Education.

ENGLISH

For major work in English the student is required to complete (1) twelve hours of starred courses; (2) twenty-four hours of upperclass courses; and (3) eighteen hours in related courses. The choice of these courses is subject to the following restrictions:

- a. *At least six hours of the upperclass courses must be chosen from Group I below.*
- b. *The student must so arrange his program, with the assistance of his adviser, as to include the study of some literature before 1640, and some between 1640 and 1830.*

N.B. Courses in Group I, other than the one chosen to satisfy the requirement in (a), may be used to satisfy the requirement in (b).

c. *The eighteen hours in related courses must be chosen from courses in the Classics, the Modern Languages (after the College requirements are satisfied), the Comparative Study of Literature, Public Speaking, Philosophy, History, Music, and the Fine Arts. In general, the student will be expected to complete twelve of these eighteen hours in one Department.*

The Department of English strongly recommends that students who intend to choose English as their major subject take English History in their first or second year.

Candidates for graduation with honors in English must plan their programs with this end in view when they first choose major advisers. An oral examination on a list of readings will be given in October of the student's senior year, and a comprehensive written examination in May preceding his graduation.

Students preparing for the teaching of English in secondary schools should consult Professor Hulse in the Department of Education as early as their freshman year, or as soon after as the decision is reached. Such students should include in their programs at least fifteen hours of Public Speaking, including courses 1, 10, 32, and 41.

FOR FRESHMEN

*2. **Introductory Course in Composition and Literature.** Throughout the year. Credit three hours a term. May not be entered in the second term. Messrs. TENNEY, ADAMS, BALD, CURTIN, DUFFY, LIPA, MAURER, MOORE, SALE, THOMPSON, WIENER, WILSON, and others. M W F 8, 9, 10, 11, 12; T Th S 8, 9, 10, 11. Rooms to be announced.

The course, open to freshmen who have satisfied the entrance requirements in English, is a training in the reading and writing of English. All those who elect this course must apply as follows for assignment to sections: the first term at the *Drill Hall*; second term at *Goldwin Smith* C. Assistant Professor TENNEY is in charge of the course.

*2a. **Introductory Course in Composition and Literature.** Second term. A repetition of the first term of English 2. T Th S 8. *Goldwin Smith* A.

*15. **The Study of Poetry.** Second term. Credit three hours. Open to freshmen. Assistant Professor TENNEY. T Th S 8. *Goldwin Smith* 156.

FOR SOPHOMORES

*20a. **Composition.** Repeated in second term. Credit three hours. T Th 12 and an hour to be arranged. Dr. MOORE. *Goldwin Smith* 164.

A course designed for the student who has completed the required work of English 2 without distinction and who wants additional drill in writing clear and accurate English. Class discussion of modern English usage will be supplemented by conferences on individual difficulties.

*20. **Prose and Composition.** Throughout the year. Credit three hours a term. May be entered in either term. Prerequisite, credit for both terms of English 2 or the equivalent. M W F 9, Dr. WIENER, *Goldwin Smith* 164; M W F 10, Assistant Professor FRENCH, *Goldwin Smith* 164; M W F 11, Professor MONROE, *Goldwin Smith* 164; M W F 12, Mr. DUFFY, *Goldwin Smith* 164; T Th S 9, Dr. CURTIN, *Goldwin Smith* 164; T Th S 10, Assistant Professor NUNGEZER, *Goldwin Smith* 164.

*21. **Introduction to Poetry.** First term. Credit three hours. Professor DAVIS. T Th S 11. *Goldwin Smith* A. Text: Brooks and Warren, *Understanding Poetry*.

*22. **The Romantic Poets.** Throughout the year. Credit three hours a term. Professor BROUGHTON. M W F 11. *Goldwin Smith* A.

Wordsworth, Coleridge, Byron, Shelley, Keats, and others.

*23. **Introduction to the Drama.** First term. Credit three hours. Assistant Professor MYERS. M W F 10. *Goldwin Smith* B.

An introduction to the drama as a form of literature, and to the distinguishing qualities of tragedy, comedy, melodrama, and farce. Reading of fifteen representative classical and modern plays.

*24. **Introduction to Shakespeare.** Second term. Credit three hours. Assistant Professor SALE. M W F 10. *Goldwin Smith* B.

A reading of representative plays.

*26. **Introduction to Prose Fiction.** Second term. Credit three hours. Dr. WIENER. T Th S 11. *Goldwin Smith* A.

A study of representative types of the novel and short story, both English and American, and of the past and the present.

FOR UPPERCLASSMEN

Note: All courses listed within brackets will not be given in 1939-40, but will be given in 1940-41. The following courses, given in 1939-40, will not be repeated until 1941-42: 33, 36, 40a, 47, 49, 53a, 56, 71, 74, 79, 84, 89.

GROUP I

Courses in this group may not be entered in the second term.

32. **Mediaeval Literature.** Throughout the year. Credit three hours a term. Dr. THOMPSON. T Th S 9. *Goldwin Smith* 160.

A study in English translation of representative classics.

33. **Sixteenth Century Literature.** Throughout the year. Credit three hours a term. Assistant Professor ADAMS. T Th S 10. *Goldwin Smith* 227.

A study of the non-dramatic literature of England from the beginning of the Renaissance to the close of the reign of Elizabeth.

[34. **Seventeenth Century Literature.** Throughout the year. Credit three hours a term. Professor BALD. M W F 9.

Studies in seventeenth century prose and poetry from Donne to Dryden.]

[35. **Eighteenth Century Literature.** Throughout the year. Credit three hours a term. First term, Professor DAVIS; second term, Professor MONROE. T Th S 10.

Studies in the prose writings of Addison, Steele, Swift, Johnson, Burke, and others; and in the poets of the Restoration and the eighteenth century, including the beginnings of the English Romantic Movement.]

36. **Victorian Literature.** Throughout the year. Credit three hours a term. First term, Professor NORTHUP; second term, Dr. CURTIN. M W F 9. *Goldwin Smith* 134.

First term: lectures on the chief characteristics and literary tendencies of the chief writings of prose, including the novelists. Second term: a study of Victorian poetry.

38. **History of English Literature.** Throughout the year. Credit six hours on completion of the course. Professor BALD. M W F 9. *Goldwin Smith* 156.

Not open to students who have taken course 25, *History of English Literature*, offered in 1937-38. Fee for materials, \$2.

39. **American Literature.** Throughout the year. Credit three hours a term. Assistant Professor MYERS. M W F 12. *Goldwin Smith* 156.

First term: Colonial and Revolutionary literature; National literature to 1830; second term: literature from 1830 to 1915.

GROUP II

40a. **The English Novel.** First term. Credit three hours. Assistant Professor SALE. M W F 10. *Goldwin Smith* 225.

A critical study of selected English novels. This course may be elected by those students who took course 47, *The English Novel*, in the first term of 1938-39. The material will not be duplicated.

[40b. **The English Novel.** First term. Credit three hours. Assistant Professor SALE. M W F 10.

A critical study of selected English novels. This course may be taken by those who have had 40a, but 40a is not a prerequisite.]

[41a. **The American Novel.** Second term. Credit two hours. Professor SIBLEY. T Th 12.

Studies in the early American novel with particular attention to Poe, Hawthorne, and Melville.]

[41b. **The American Novel.** Second term. Credit two hours. Assistant Professor SALE. T Th 11.

A critical study of the novels of James, Howells, Mark Twain, and their successors.]

42. **Early Nineteenth Century Novel.** First term. Credit three hours. Professor BROUGHTON. M W F 2. *Goldwin Smith* 156.

A survey of fiction from the advent of the Gothic novel to the beginnings of the Victorian. Extensive readings in the works of Jane Austen, Maria Edgeworth, Sir Walter Scott, and others.

45. **The English Drama to 1642.** Throughout the year. Credit three hours a term. Assistant Professor NUNGEZER. M W F 11. *Goldwin Smith* 134.

First term: the origin of the drama; mysteries, saint plays, moralities; folk plays, interludes; the rise of professional actors; the development of stagecraft; the court plays; the academic drama. Second term: the erection of permanent playhouses; the contemporaries and successors of Shakespeare; the suppression of acting.

[46. **The Drama of the Restoration and the Eighteenth Century.** Second term. Credit three hours. Dr. WIENER. M W F 11.

A study of representative plays from the re-opening of the theatres to Sheridan, including Dryden, Wycherley, Otway, Congreve, Addison, Steele, Gay, Fielding, and Goldsmith.]

47. **Tragedy and Comedy.** Second term. Credit three hours. Assistant Professor MYERS. T Th S 10. *Goldwin Smith* 124.

A study of classical and modern theories of drama accompanied by the reading of representative tragedies and comedies.

[48. **Modern Drama.** Second term. Credit three hours. Assistant Professor MYERS. T Th S 10.

A study of modern English, Continental, and American plays. Reading at the rate of three plays a week.]

53a. **Modern American Poetry.** First term. Credit three hours. Assistant Professor FRENCH. T Th S 10. *Goldwin Smith* 134.

A study of the American poets from 1900 to the present.

[53b. **Modern English Poetry.** First term. Credit three hours. Assistant Professor FRENCH. T Th S 10.

A study of the English poets from 1900 to the present.]

55. **Biography.** Throughout the year. Credit three hours a term. Assistant Professor TENNEY. T Th 9 and an hour to be arranged. *Goldwin Smith* 234.

First term: ancient and mediaeval biography; second term: modern biography.

56. **Middle English Metrical Romances.** Second term. Credit two hours. Assistant Professor FRENCH. T Th 2:30-4. *Goldwin Smith* 162.

A study of early English fiction.

57. **The Myths in English Literature.** First term. Credit three hours. Professor NORTHUP. M W F 12. *Goldwin Smith* 134.

A study of the development of myths and the use made of them by authors of the English-speaking world. Lectures, readings, and reports.

GROUP III

60. **Chaucer and his Age.** Throughout the year. Credit three hours a term. The first term is not prerequisite to the second. Assistant Professor FRENCH. M W F 12. *Goldwin Smith* 162.

First term: Chaucer's life; his contemporaries; *Troilus and Criseyde*; the minor poems; second term: *The Canterbury Tales* and Chaucer's successors in the fifteenth century.

61. **Shakespeare.** Throughout the year. Credit three hours a term. Assistant Professor ADAMS. M W F 11. *Goldwin Smith* C.

Open to students who have had twelve hours of English at the grade of 70 or better; may not be entered in the second term.

63. **Milton.** First term. Credit three hours. Professor DAVIS. T Th S 10. *Goldwin Smith* 156.

A study of Milton's poetry and of selections from his prose.

65. **Wordsworth.** Second term. Credit three hours. Professor BROUGHTON. M W F 2. *Goldwin Smith* 248.

A study of Wordsworth's poetry and prose. Prerequisite, English 22 or the equivalent.

71. **Spenser.** First term. Credit three hours. Dr. WILSON. M W F 12. *Goldwin Smith* 245.

72. **Dryden and Pope.** First term. Credit two hours. Professor MONROE. T Th 12. *Goldwin Smith* 245.

Studies in the poetry of the Restoration and early eighteenth century. Offered in 1940-41 as part of course 35.

[73. **Pope.** Second term. Credit three hours. Professor DAVIS. T Th S 10.
A study of the poetry of Pope and his contemporaries.]

74. **Johnson.** Second term. Credit three hours. Professor DAVIS. T Th S 10. *Goldwin Smith* 156.

A study of the work of Johnson and his contemporaries.

76. **Byron and Shelley.** Throughout the year. Credit three hours a term. Professor PRESCOTT. M W F 12. *Goldwin Smith* 160.

The first term will be devoted mainly to Byron's poems and letters; the second to Shelley.

77. **Coleridge and Keats.** Second term. Credit three hours. Professor BALD. T Th 2. *Goldwin Smith* 245.

In 1939-40, the course will be devoted mainly to Coleridge; in 1940-41, mainly to Keats.

[78. **Newman and Arnold.** First term. Credit three hours. Dr. MAURER. M W F 11.
A study of the prose of Newman and Arnold in relation to contemporary thought.]

79. **Tennyson and Browning.** First term. Credit three hours. Dr. MAURER. M W F 11. *Goldwin Smith* 245.

A study of Tennyson and Browning as individual poets and in relation to contemporary thought and prosody.

GROUP IV

81. **Old and Middle English.** Throughout the year. Credit three hours a term. Professor MONROE. M W F 10. *Goldwin Smith* 162.

Old English grammar. Reading of selections from *Old English Chronicle*, King Alfred, Aelfric, and other representative prose texts, and of the simpler poetry. A part of the second term is devoted to early Middle English, preparatory to the study of Chaucer.

82. **The English Language.** Second term. Credit two hours. Professor MONROE. T Th 12. *Goldwin Smith* 162.

The development of the English language, with consideration of language in general, including elementary phonetics. Recitations, lectures, collateral reading. The course does not require previous knowledge of Old and Middle English.

84. **Advanced Composition.** Second term. Credit three hours. Dr. WILSON. T Th 12 and conferences. *Goldwin Smith* 160.

85. **English Style and Usage.** Throughout the year. Credit two hours a term. For juniors preparing to teach English. Assistant Professor TENNEY. Th 7:30. *Goldwin Smith* 245.

First term: history and theory of English syntax, with practice. Second term: analysis of English prose forms, with practice in writing.

[88. **English Composition.** First term. Credit three hours. Assistant Professor SALE. The consent of the instructor must be secured before registration. T Th 11 and conferences.]

A training in the various skills required in the writing of short or long pieces of fiction. Frequent brief exercises and the composition of one short story will be required.]

89. **Literary Criticism.** Second term. Credit three hours. Assistant Professor SALE. The consent of the instructor must be secured before registration. T Th 11 and conferences. *Goldwin Smith* 160.

The theory and practice of literary criticism.

See also in COMPARATIVE STUDY OF LITERATURE courses 27, **Modern Writers on Art**; 28, **English Translations of Greek and Latin Classics**; 103b, **Middle English**; 104, **Principles of Literary Criticism**; and 105, **General Reading**.

THE FINE ARTS

For major work in the Fine Arts the following courses must be completed: (1) Nine hours in Aesthetics, namely Philosophy 8a, 8b, and either 19 or senior informal study with the adviser. (2) (a) Music, two approved courses; (b) nine hours in the History of Architecture, Painting, and Sculpture; (c) nine hours of literature, to be elected from approved courses in Classics, Comparative Study of Literature, English, German, Public Speaking, and Romance Languages. (3) Twelve hours of approved advanced courses in one of three fields: (a) Literature (literary history, criticism, writing, and dramatics); (b) Art and Architecture (history, composition, and design); (c) Music (theory, composition, and application).

For a major in the History of the Fine Arts 1a, 1b, 10a, 10b and eighteen other hours in the History of Art must be completed. In addition, there must be completed fifteen hours of related courses, including Philosophy 8a and 8b.

Students who desire major work in Fine Arts will apply to the Dean for advice.

The courses which follow are those offered by the Department of Fine Arts, together with certain courses open to students of this College in the College of Architecture.

The courses listed from the College of Architecture may not be counted in the ninety hours required in the College of Arts and Sciences.

GENERAL

A. **Survey of European Paintings and Sculptures in American Museums.** First term. Credit three hours. Open to freshmen and upperclassmen. Assistant Professor CHURCH. M W F 11. *Goldwin Smith, Museum of Casts.*

8a. **Aesthetics: Psychology of Art.** (See Philosophy 8a.) First term. Credit three hours. Open to sophomores, juniors, and seniors. Professor OGDEN. T Th S 11. *Goldwin Smith, Museum of Casts.*

A study of the aesthetic experience as criterion of art and skill. Special topics: music, poetry, painting, sculpture, architecture, and eurhythmics. Designed for all students interested in the Fine Arts.

8b. **Aesthetics: Philosophy of Art.** (See Philosophy 8b.) Second term. Credit three hours. Prerequisite, Aesthetics 8a or three hours of Philosophy. Assistant Professor CHURCH. T Th S 11. *Goldwin Smith* 227.

An introduction to several modern theories of art. Emphasis is laid on the underlying principles of the aesthetic experience with particular reference to painting, sculpture, and the novel.

HISTORY OF ART

1a. **History of Painting and Sculpture: Ancient and Medieval.** First term. Credit three hours. Assistant Professor WAAGÉ. Registration limited to 75. All students, except freshmen, must register for this course with Assistant Professor WAAGÉ or Professor FINLAYSON at 46 *White Hall* on registration day. M W F 2. *Goldwin Smith, Museum of Casts.*

1b. **History of Painting and Sculpture: Renaissance and Modern.** Second term. Credit three hours. Professor FINLAYSON. A continuation of 1a, which is a prerequisite for this course. M W F 2. *White* 28.

2. **History of Greek Sculpture.** First term. Credit three hours. Assistant Professor WAAGÉ. M W F 10. *Goldwin Smith, Museum of Casts.*

3. **Art of the Roman Empire.** Second term. Credit three hours. Assistant Professor WAAGÉ. M W F 10. *Goldwin Smith, Museum of Casts.*

After a sketch of Etruscan and Republican art, the evolution of Hellenistic sculpture and painting will be traced through the Empire to the sixth century. A few lectures will be devoted to the minor arts.

4. **Ancient Art.** Second term. Credit three hours. Assistant Professor WAAGÉ. M W F 11. *Goldwin Smith, Museum of Casts.*

The history of pre-Greek and non-Greek art in the Mediterranean region from the Old Stone Age to the end of the Persian Empire. Sculpture, painting, and the minor arts will be studied.

426. **History of Northern Painting.** Throughout the year. Credit three hours a term. Professor FINLAYSON. Painting in France, Germany, the Netherlands, and England from the sixteenth century to modern times. Either term may be elected without the other. Courses 1a and 1b are prerequisite. M W F 11. *White* 28. Given in alternate years; will be given in 1939-40.

[428a. **Romanesque and Gothic Sculpture.** First term. Credit three hours. Prerequisite, course 1a. Professor FINLAYSON. Sculpture in the major European countries from 1000 A. D. through the Gothic period. M W F 11. *White* 28. Given in alternate years; not given in 1939-40.]

[428b. **Gothic Painting.** Second term. Credit three hours. Prerequisite, course 1a. Professor FINLAYSON. Painting in Italy in the fourteenth century, and in France, Germany, and the Netherlands in the fourteenth and fifteenth centuries. M W F 11. *White* 28. Given in alternate years; not given in 1939-40.]

[5. **Renaissance and Modern Sculpture.** Second term. Credit three hours. Mr. UNDERWOOD. M W F 10. *Goldwin Smith, Museum of Casts.* Not given in 1939-40.]

This course includes a study of the evolution of sculpture in Europe and America, and of the changes in taste from the fifteenth century to the present day, by means of analyses of the works of representative sculptors and the use, where necessary, of parallels in painting and sculpture.

6. **Florentine and Venetian Painting.** Second term. Credit three hours. Mr. UNDERWOOD. T Th S 10. *Goldwin Smith, Museum of Casts.*

The course treats of the history of painting in the two great centers of Italy. Among the major figures whose lives and works will be studied are Giotto, Fra Angelico, Masolino and Massaccio, Botticelli, the Bellinis, Leonardo, Giorgione, Titian, Michelangelo, Tintoretto, Veronese, and Tiepolo.

[7. **The Impressionists.** Not given in 1939-40.]

429, 430. **Historical Seminary in Painting and Sculpture.** Throughout the year. Credit two hours a term. Professor FINLAYSON. Registration limited. Open to graduate students and qualified undergraduates. Ten hours of the History of Art or their equivalent are prerequisite. By appointment. Students wishing to elect this course must register with Professor FINLAYSON by the Monday before review week preceding the opening of the course. Exception will be made only in the case of graduate students entering the University in September.

[8. **Art of the Far East.** Not given in 1939-40.]

[9. **Methods and Materials of Mediaeval and Renaissance Painting.** Not given in 1939-40.

A survey of the development of styles of painting out of the practices of the masters. Demonstrations by the instructor in fresco, egg-tempera, and certain methods of painting in oils. Lectures on the historical and aesthetic significance of these methods and materials.]

10a. **History of Architecture: Ancient and Medieval.** First term. Credit three hours. Mr. UNDERWOOD. Open to freshmen with the permission of the instructor. T Th S 11. *White* 28.

10b. **History of Architecture: Renaissance and Modern.** Second term. Credit three hours. Mr. UNDERWOOD. A continuation of 10a. T Th S 11. *White* 28.

COURSES IN THE COLLEGE OF ARCHITECTURE

Open to election by students in the College of Arts and Sciences.

[072. **Appreciation of Architecture.** Second term. Credit two hours. Registration limited. Open to non-technical upperclass students by permission. No ability in drawing required. An analytical and historical study of specific examples of architecture. Lectures with assigned readings, essays, and examinations. T Th 2. *White* 28. Not given in 1939-40.]

410. **Ancient Architecture.** First term. Credit three hours. Mr. UNDERWOOD. Egyptian, Western Asiatic, Greek, Roman, Early Christian, and Byzantine architecture. Lectures with assigned readings, sketches, and examinations. T Th S 9. *White* 28.

411. **Mediaeval Architecture.** Second term. Credit three hours. Prerequisite, course 410. Assistant Professor DUNBAR. Mohammedan, Romanesque, and Gothic architecture. Lectures with assigned readings, sketches, and examinations. T Th S 9. *White* 28.

412. **Renaissance Architecture.** First term. Credit three hours. Prerequisite, course 411. Assistant Professor DUNBAR. Architecture of the Renaissance and to the beginning of the nineteenth century in the principal European countries. Lectures with assigned readings, sketches, and examinations. M W F 9. *White* 28.

413. **Modern Architecture.** First term. Credit three hours. Prerequisite, courses 410, 411, and 412. Assistant Professor DUNBAR. Nineteenth century and more recent work in the principal European countries, and the architecture of the United States from the Colonial times to the present. Hours to be arranged. *White* 28.

Drawing and Painting:

309. **Creative Drawing.** Throughout the year. Credit three hours a term. Assistant Professor WASHBURN. Open to freshmen and upperclassmen. Registration limited; students will obtain permission from Mr. Washburn before registering. M 3, *White* 28; W F 1:40-4. *Franklin* 37.

This course is designed to meet the needs of the non-professional student interested in art; the course includes a study of the methods used in drawing and painting in showing their relation to the artistic content of the resultant work. Studio work, lectures, assigned readings, and examinations. Illustrative material will be drawn largely from contemporary sources.

This sequence of courses is primarily technical work for a painter. The work consists of a study of form and its representation, various media being used. The first year's work is in pencil and charcoal from geometric models, still life objects, and from the cast. Special emphasis is given to drawing forms in their spacial relationships. This continues through the second year's work from the life model. The study of Anatomy parallels the work in drawing. In the third year, the course includes study in color of the nude, of the draped model, and portraiture. The work in drawing and painting is correlated with that in composition.

310. **First Year Drawing.** Credit three hours each term. Section A: T Th S 10-12:30. Assistant Professor WASHBURN. Section B: M W F 10-12:30. Assistant Professor BRAUGHT. *Franklin* 37.

311. **Second Year Drawing.** Credit three hours each term. Assistant Professor BRAUGHT. M W F 1:40-4. *Franklin* 38.

312. **Third Year Drawing and Painting.** Credit four hours first term; six hours second term. Professor MIDJO. First term, M W F 9-12:30. Second term, M W F 8-12:30 and F 1:40-4. *Franklin* 38.

313. **Fourth Year Painting.** Credit six hours each term. Professor MIDJO. M W F 8-12:30 and F 1:40-4. *Franklin* 38.

Courses 310-313 are prerequisite to one another.

Modeling:

These courses begin with a study of architectural ornament from Plaster Casts, then the human head and figure from Antique Casts. The advanced work is sculptural portraiture and figure from life.

330. **Elementary Modeling.** Credit two hours each term. Assistant Professor WASHBURN. Prerequisite, course 310. Th S 8-10:30. *Morse*.

331. **First Year Modeling.** Credit four hours first term; six hours second term. Assistant Professor WASHBURN. T Th S 8-10:30 and Th 1:40-4. Criticisms as arranged. *Morse*.

332. Fourth Year Modeling. Credit six hours each term. Assistant Professor WASHBURN. Hours same as in 331. Criticisms as arranged. *Morse*.

333. Fifth Year Modeling. First term. Credit six hours. Assistant Professor WASHBURN. Hours same as in 331. Criticisms as arranged. *Morse*.

GEOLOGY

Those who are planning a career in geology or will seek the recommendation of the department for continuation of their studies in graduate work must complete the following courses for a major: Geology A, 102, 103, 107, 200, 205, 311, 317, either 318 or 319, 400, 402, 403, 500. In related subjects, fifteen hours, which should include Chemistry 102a, 102b; Physics 3, 4 or 3, 6; and a selection from the following: Astronomy 180, 181; Meteorology 1, 2; Zoology 1, 16; Philosophy 15; Mathematics 15; Botany 1; Soils 1. Such students should if possible organize their schedules for the major at the beginning of the sophomore year.

Those who choose geology and geography as a major in a general cultural program may satisfy the requirements by completing not less than twenty-four hours in any of the advanced courses in geology and geography, and fifteen hours of related subjects selected from the list in the preceding paragraph and from these added items: Economics 1, 45, 50a, 51, 82; History 82, 86, 87, 89.

Those who have special interests in fields closely connected with some one branch of geology may also have approved by the professor in charge of that branch any of the following courses: Chemistry 130, 135, 205, 206, 210, 220, 221, 225, 405, 410, 530; Mathematics 1, 2, 3, 6a, 6b, 6c; Physics 60, 61, 62; Biology A, Zoology 8.

GENERAL COURSES

***A. General Geology and Physiography.** Introduction to Earth Science. Throughout the year. Credit three hours a term. Both terms of the course must be completed to obtain credit, unless the student is excused by the department. Professor VON ENGELN and Mr. BERRY. Lectures, T Th 11. *McGraw*. Laboratory, M W Th or F afternoons, 1:40. *McGraw*.

Students must register at the Geology office, *McGraw Hall*, for lecture and laboratory assignments. The course comprises an introduction to the various branches of geological science, lithologic, physiographic, structural, glacial, economic, and historic geology in their broader aspects. Methods of geological and physiographic study in the field and laboratory are emphasized.

***100. Introductory Geology.** Repeated in the second term. Credit three hours. Professor NEVIN and Dr. BERTHAUME. Lectures, T Th 9, first term; T Th 11, second term. *Warren Hall* 25. Laboratory, M T W Th F afternoons, 1:40. *McGraw*.

Students must register for laboratory assignment before beginning the course. The fundamental principles of this branch of science. The inorganic aspects of the subject are emphasized more than the organic. This course cannot be elected by Arts and Sciences students for satisfaction of the science group requirement.

***401. Ancient Life (History of Life).** First term. Credit three hours. Dr. MERRIAM. A résumé of organic development during the course of Earth history, with emphasis on evolution of vertebrate life from primitive fish to man. Lectures M W F 9. *McGraw*. Demonstrations to accompany Friday lecture.

The course is designed for the general student who desires a fundamental but not too technical knowledge of evolution and distribution of life, and an understanding of the geologic background from which the human group has emerged.

DYNAMIC AND STRUCTURAL GEOLOGY

102. Structural Geology. First term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, M W 9. Laboratory, W 1:40. *McGraw*. A study of geologic structures and their causes. Part of the laboratory periods will be spent in the field.

103. Sedimentation. First term. Credit three hours. Prerequisite, Geology A, or 100 by permission. Professor NEVIN. Lectures, M W 11. Laboratory, M 1:40. *McGraw*. Part of the laboratory periods will be spent in the field. This course is devoted to a study of the principles involved in the formation of sediments. Registration by permission.

106. **Special Work in Sedimentation, Structural, and Petroleum Geology.** Throughout the year. Credit variable. Prerequisites, variable. Professor NEVIN. Hours to be arranged. *McGraw*.

For advanced students and graduates. Original investigation adapted to the needs of the student.

107. **Geologic Mapping.** Given in the Summer Field School.

A discussion of the fundamental methods used in geologic mapping, together with practical work in the field. For students majoring in Geology.

GEOMORPHOLOGY AND GEOGRAPHY

200. **Geomorphology.** First term. Credit three hours. Prerequisite, Geology A. Professor VON ENGELN. Lectures, T Th 9. Laboratory, T 1:40. *McGraw, Physiography Laboratory*.

The interpretation of land forms with regard to process and stage and the adjustment of topography to structure. The technology of geomorphological description.

205. **Glaciers and Glaciation.** Second term. Credit three hours. Prerequisite, Geology A. Professor VON ENGELN. Lectures, T Th 9. Laboratory, T 1:40. *McGraw*.

Living glaciers and the phenomena of the glacial period. Students are required to have one or more Saturdays free for all-day excursions in the Spring. Mapping and interpretation of glacial deposits.

206. **Commercial Geography.** Second term. Credit three hours. Professor VON ENGELN. Lectures, M W F 9. *McGraw, Geology Lecture Room*. Not open to freshmen.

The geographic factors affecting production and distribution of commodities, historically and in modern times. Natural geographic regions in relation to their past and prospective exploitation. Nature of city sites and the geographic conditions of city growth, organization, and functioning. It is desirable to have had an elementary course in Economics or in Geology before taking this course.

208. **Advanced Physiography, Experimental and Research Work.** Credit variable. For advanced and post-graduate students. Registration by permission. Professor VON ENGELN.

209. **Seminary.** First or second term. Credit one hour. For post-graduate students and seniors under special circumstances. Registration by invitation. Professor VON ENGELN.

MINERALOGY AND PETROGRAPHY

311. **Elementary Mineralogy.** Repeated in second term. Credit three hours. Prerequisite, Chemistry 102 or 104. Assistant Professor BURFOOT and Mr. MOORE. Lectures: first term: W F 10; second term: M W 12. Laboratory: first term: M W, or Th 1:40; second term: W or Th 1:40. Additional hours if necessary. *McGraw, Geology Lecture Room*.

For beginners who desire a general knowledge of crystallography and of the commonest minerals, the properties by which they are recognized, their uses, and their significance as constituents of the crust of the earth. In the laboratory, various determinative methods are used for identifying the minerals.

316. **Metamorphic Geology.** First term. Credit two hours. For advanced students. Registration by permission only. Assistant Professor BURFOOT. T Th 12.

A general survey of the field of metamorphic geology with especial emphasis on processes and criteria. Metamorphic differentiation, the facies classification of metamorphic rocks, and retrogressive metamorphism are among the subjects considered. Special suites illustrating these phenomena are used. Work with the petrographic microscope will be given to those students who are qualified and desire to take it.

317. **Optical Mineralogy.** First term. Credit three hours. Prerequisite, Geology 311. Assistant Professor BURFOOT. Lectures, M Th 10. Laboratory, S 9-11:30. *Mineralogy Laboratory, McGraw*.

The theory and use of the microscope in the determination and study of minerals and rocks. The commoner rock-forming minerals are studied in fragments and in thin sections.

[318. **Petrography.** Second term. Credit three hours. Prerequisite, Geology 317. Assistant Professor BURFOOT. Lectures, T Th 10. Laboratory, F 9-11:30. *Mineralogy Laboratory, McGraw*. Given in alternate years. Not given in 1939-40.

A consideration of the commoner kinds of igneous rocks, of various classifications used, and of the general principles of petrology, including the origin of and the conditions under which igneous rocks are formed.]

319. Sedimentary Petrography. Second term. Credit three hours. Prerequisite, Geology 317. Assistant Professor BURFOOT. Lectures, T Th 10. Laboratory, F 9-11:30. Given in alternate years.

The methods of investigating the mineral composition, texture, and other physical characteristics of sedimentary rocks, and some of the applications of these methods to geological problems.

PALEONTOLOGY AND STRATIGRAPHIC GEOLOGY

402. Stratigraphy. First term. Credit three hours. Prerequisites, Geology 102, 103, and 403; Geology 102 and 103 may be taken concurrently. Two week-end field trips of two days each at opening of term. Lectures, M W F 12. Assistant Professor MERRIAM.

Classification, nomenclature, and distribution of the stratified rocks; criteria of geologic correlation. Emphasis on the New York Paleozoic section.

403. Introductory Paleontology. Throughout the year. Credit three hours each term. Prerequisite, Geology A or Geology 100 by permission. Assistant Professor MERRIAM. First term, lecture T 10, laboratory Th 1:40 and one additional laboratory period to be arranged. Second term, lecture M 10, laboratory M 1:40 and one additional laboratory period to be arranged. Two laboratory periods required each term.

First term, morphology and evolution of fossil invertebrates; second term, index fossils and faunas of the geologic periods.

406. Paleontologic and Stratigraphic Problems. Throughout the year. May be begun either term. Credit variable. For advanced and graduate students. Prerequisite, permission of the instructor. Assistant Professor MERRIAM. Conference by arrangement. *McGraw* 28.

407. Paleobotany. Second term. Credit one hour. Assistant Professor MERRIAM. W 10. A brief resumé of the history of the plants, with emphasis upon their stratigraphic distribution, their value as indicators of past climates, and their influence on the evolution of land-animal life.

ECONOMIC GEOLOGY

500. General Economic Geology. Throughout the year. Credit three hours a term. Prerequisite, Geology A and 311. Professor ——— and Mr. LUDLUM. Lectures, T Th 11. Laboratory or field trip, F 1:40. *McGraw*.

The origin, nature, distribution, uses and economics of mineral products. First term, non-metallics, including coal, oil, gas, fertilizers, etc.; second term, the ore deposits of the different metals.

***501. Engineering Geology.** Repeated in second term. Credit four hours. For engineering students. Others only by permission. Professor ——— and Mr. LUDLUM. Lectures, M W 11. Two laboratory periods, T Th 1:40. *McGraw*. Not the equivalent of Geology A or 100.

A discussion of the practical application of geologic principles to engineering work, and of the occurrence of such economic materials as are of importance to engineering students.

502. Petroleum Geology. Second term. Credit three hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, M W 9. Laboratory, M 1:40. *McGraw*.

A course on the geology and distribution of petroleum. Geology 503 should, if possible, be taken first.

[503. Petroleum Technology. First term. Credit two hours. Prerequisite, Geology A or 100 by permission. Professor NEVIN. Lectures, T Th 9. *McGraw*.

The geological factors affecting the location of wells, production technology, and valuation problems. Not given in 1939-40.]

GERMAN

For a major in German the following courses must be completed: (1) in German, courses 1-5 or their equivalent, and at least twenty-one hours of advanced courses, including 15, and at least one course each in Lessing, Goethe, and Schiller; (2) in related subjects, at least fifteen hours selected from Bibliology, the Classics (Archaeology, Greek, Latin), Comparative Study of Literature, English, History, Philosophy, Romance Languages, Scandinavian Languages and Literatures.

*1. **Course for Beginners: Oral Training, Grammar, Composition, Translation.** Second term only. Credit six hours. Professor POPE. Daily 10. *Goldwin Smith* 183.

This course is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected for three hours' credit by students who have entrance credit for only one unit of German (first year German).

1a. **Course for Beginners: Oral Training, Grammar, Composition, Translation.** Throughout the year. Credit six hours on completion of the course. Professor POPE, Assistant Professor LANGE, Dr. DILKEY, and Dr. MUELLER. M W F 9, 10, 11; T Th S 9, 11. *Goldwin Smith* 177, 183, 190, 177, 183.

This course is continuous throughout the year, and no credit is allowed for the first term alone. It is equivalent to first and second year German of the entrance requirements (credit two units). It may be elected in the second term by students who have had first year German (one unit).

*1c. **Course for Chemists: Grammar, Reading of Texts in Chemistry.** Throughout the year. Credit six hours on completion of the course, three hours for those taking it only the second term. Professor ANDREWS and Dr. MUELLER. M W F 11, 12. *Goldwin Smith* 183, 190.

May not be taken by candidates for the A.B. degree without special permission. For further details apply to the Department of Chemistry.

*3. **Intermediate Course. Oral Training, Grammar, Composition, Translation.** Repeated in second term. Credit five hours. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German). Assistant Professors SCHNEIDER and LANGE. M T W Th F 10. *Goldwin Smith* 190.

This course is equivalent to third year German of the entrance requirements.

*3a. **Intermediate Course. Oral Training, Grammar, Composition, Translation.** Throughout the year. Credit three hours a term. Prerequisite, German 1, 1a, or entrance credit for two units of German (first and second year German). Professor BOESCHE, Dr. DILKEY, and Dr. MUELLER. M W F 9, 11; T Th S 10. *Goldwin Smith* 190, 177, 177

This course is equivalent to third year German of the entrance requirements.

*4. **Elementary German Composition and Conversation.** Throughout the year. Credit three hours a term. Open to those who are taking or have taken German 3, or its equivalent. Professor POPE and Assistant Professor SCHNEIDER. M W F 9, 12. *Goldwin Smith* 183.

Exercises conducted in German. Course 4 may be combined with courses 3 or 5.

*5. **Modern German Texts.** Throughout the year. Credit three hours a term. Prerequisite, German 3, or its equivalent. Professor ANDREWS, Assistant Professor LANGE, and Dr. DILKEY. T Th S 11, 12. *Goldwin Smith* 190.

Extensive reading and discussion.

[*6. **German Civilization.** Second term. Prerequisite, three years of entrance German, or its equivalent. Open to freshmen. Not accepted in fulfillment of the underclass group requirement. In charge of Professor POPE. Credit two hours.

Lectures in English, translation, and outside reading in German, on the general aspects of German civilization. Not given in 1939-40.]

*7. **German Literature from Goethe to the Present.** Throughout the year. Credit two hours a term. Open to sophomores and upperclassmen. Assistant Professor LANGE. T Th S 3-4. *Goldwin Smith* 190.

A survey of German Literature in its relation to general European thought. Lectures in English with assigned reading in available translations. No requirements in German.

*8. **Scientific German.** Second term. Credit three hours. Prerequisite, German 1-3, or three years of German in high school. Professor ANDREWS. T Th S 9. *Goldwin Smith* 190.

10. **Advanced German Composition and Conversation.** Throughout the year. Credit three hours a term. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. M W F 10. *Goldwin Smith* 177.

Exercises conducted in German. This course must be completed by students who desire to be recommended as teachers of German.

11. **Schiller's Dramas.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor ANDREWS. T Th S 10. *Goldwin Smith* 178.

12. **Schiller's Poems.** Second term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. M W F 11. *Goldwin Smith* 245.

13. **Goethe's Life and Works.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor BOESCHE. T Th S 11. *Goldwin Smith* 177.

14. **Goethe's Faust**, part I and selected portions of part II. Second term. Credit three hours. Not open to freshmen. Prerequisite, German 1-5, or the equivalent. Assistant Professor SCHNEIDER. T Th S 11. *Goldwin Smith* 164.

15. **Survey of German Literature.** Lectures in English, collateral reading in German. Throughout the year. Credit three hours a term. Prerequisite, German 1-5, or the equivalent. Professor POPE. M W F 9. *Goldwin Smith* 181.

16. **Contemporary German Literature.** Throughout the year. Credit three hours a term. Prerequisite, German 1-5, or the equivalent. Assistant Professor SCHNEIDER. T Th S 9. *Goldwin Smith* 183.

A study of the literature of modern Germany, including foreign influences. Lectures in German, recitations, and collateral reading.

17. **Nineteenth Century Drama.** Kleist, Grillparzer, Hebbel, Hauptmann. First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Professor POPE. T Th S 12. *Goldwin Smith* 177.

18. **Lessing's Life and Works.** First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Assistant Professor SCHNEIDER. M W F 10. *Goldwin Smith* 178.

19. **German Lyric Poetry from Goethe to George.** Lectures in English, with assigned reading. First term. Credit three hours. Prerequisite, German 1-5, or the equivalent. Assistant Professor LANGE. Not given in 1939-40.]

20. **The German Novel from 1800 to the Present.** Lectures in English, with assigned reading. Second term. Credit three hours. Prerequisite, German 1-3, or the equivalent. Assistant Professor LANGE. M W F 12. *Goldwin Smith* 177.

21. **Introduction to the Study of the History of German Literature.** Lectures and practical assignments in bibliography. First term. Credit two hours. Assistant Professor SCHNEIDER. By appointment.

22. **The German Romantics.** Lectures in English on the chief characteristics and eminent personalities of the Romantic movement in Germany, with class discussion of texts and collateral reading. Second term. Credit three hours. Prerequisite, German 1-5 or the equivalent. Dr. DILKEY. T Th S 10. *Goldwin Smith* 181.

23. **Gerhart Hauptmann.** A study of his principal works, with an evaluation of his position in German literature. Lectures in English, discussion, collateral reading. First term. Credit two hours. Prerequisite, German 1-5, or the equivalent. Dr. MUELLER. M W 2. *Goldwin Smith* 181.

25. **Wagner's Life and Works.** First term. Credit three hours. Prerequisite, German 1-5; otherwise only by special permission. Professor POPE. Not given in 1939-40.]

36. **Friedrich Nietzsche.** Second term. Two hours a week. Primarily for graduates. Assistant Professor LANGE. By appointment.

37. **Middle High German.** Credit three hours a term. Prerequisite, German 1-5. Professor ANDREWS. M W F 3. *Goldwin Smith* 181.

In some years Middle Low German may be substituted in the second term.

40. **Teachers' Course in Methods.** First term. Credit two hours. Prerequisite, German 1-5, 10, and twelve hours of advanced work in German literature or philology. Professor POPE. Not given in 1939-40.]

42. **Gothic.** First term. Credit three hours. Professor BOESCHE. M W F 11. *Goldwin Smith* 188.

43. **Old High German.** Second term. Credit three hours. Prerequisite, German 37. Professor BOESCHE. T Th S 11. *Goldwin Smith* 188.

47. **Germanic Antiquities.** Second term. Credit one hour. Primarily for graduates. Professor ANDREWS.

A consideration of our sources of knowledge of the Germanic people up to and including the migrations. Not given in 1939-40.]

48. **Principles of Germanic Philology.** Second term. Credit two hours. Prerequisite, German 42. Professor ANDREWS. T 3-5. *Goldwin Smith* 177.

49. **Seminary in German Literature.** First term. Credit two hours. Primarily for graduates. Assistant Professor LANGE. W 3-5. *Goldwin Smith* 181.

Select problems in German literary criticism.

52. Seminary in Germanic Philology. Second term. Credit two hours. Primarily for graduates. Professor ANDREWS. F 3-5. *Goldwin Smith* 178.
Sound laws and etymologies.

GOVERNMENT

For a major in Government the following courses must be completed: (1) course 1, course 2 or 3, and a total of eighteen hours of unstarred courses in the department, of which three must be either course 10, 12a, 12b or 18; (2) in related subjects, at least twenty-four hours of unstarred courses to be selected from the following, of which twelve hours must be in History—any course in History; any unstarred course in Economics; Philosophy 4, 5; Architecture 710, 711, 712, 713, 714.

Juniors and Seniors who have a grade of 85 or better in one-half the hours they have passed may take informal study in Government.

Candidates for honors in Government will be required to take three hours of informal study during each semester of the senior year. They will also be required to pass a comprehensive examination.

Students registered in the combined Arts-Law course with a major in Government will be required to complete a minimum of twelve hours of upperclass courses in Government and fourteen hours from the list of courses in related fields printed above.

***1. American National Government.** First term. Credit three hours. Professor CUSHMAN. Lectures, T Th 9. Quiz hours to be arranged. *Goldwin Smith* A.

American national government, its historical development, organization, powers, and practical working. Attention will be given to the structure, functions, and methods of political parties.

***1a. Elementary American Government and Politics.** First term. Credit three hours. Enrollment limited. Open only to students in the colleges of Agriculture and Home Economics. Dr. HUZAR. M W F 9. *Plant Science* 141.

***2. Comparative Government.** Second term. Credit three hours. Open to students who have credit for Government 1 and to others with the consent of the instructor. Assistant Professor SHEPARD. T Th 9 and a quiz-hour to be arranged. *Boardman* A.

Government and politics of England, France, Germany, Russia, and Italy.

***3. State and Local Government.** Second term. Credit three hours. Open to students who have credit for Government 1 and to others with the consent of the instructor. Dr. HUZAR. T Th 9. Quiz hours to be arranged. *Boardman* C.

American state and local government, their historical development, organization, powers, and practical working.

6. Municipal Government and Administration. First term. Credit three hours. Open to sophomores with the consent of the instructor and to upperclassmen. Dr. HUZAR. M W F 11. *Boardman* B.

Urbanization; law of municipal corporations; relations with state and national government; metropolitan areas; forms and functions of city government; selected problems in administration.

7. Public Administration. Second term. Credit three hours. Open to sophomores with the consent of the instructor and to upperclassmen. Dr. HUZAR. M W F 11. *Boardman* B.

Development and control of bureaucracy; principles and problems of the civil service; administrative organization; fiscal processes; regulatory administration.

9. Introduction to International Relations. First term. Credit three hours. Open to sophomores and upperclassmen. Professor BRIGGS. M W F 9. *Boardman* A.

A survey of nationalism, internationalism, imperialism, and the racial, political, economic, and geographical factors in modern international relations.

10. Recent and Contemporary Political Theory. Second term. Credit three hours. Open to sophomores with the consent of the instructor, and to upperclassmen. Assistant Professor SHEPARD. T Th S 12. *Boardman* A.

Recent and contemporary political theory; authority, liberty, and obedience; aristocracy and representative government; dictatorship; pluralistic, communistic, and fascistic theories.

11. Comparative Political Institutions. First term. Credit three hours. Open to sophomores with the consent of the instructor, and to upperclassmen. Prerequisite, credit for Government 2, or the consent of the instructor. Assistant Professor SHEPARD. T Th S 10. *Boardman* C.

A functional study of various institutions and processes of government, such as administration and bureaucracy, legislative systems, functional representation, and the corporate state. One-, two-, and multi-party systems.

Fee, in lieu of textbook, \$1.00.

12a. **History of Political Theory: Ancient.** (See Philosophy 10a.) Professor SABINE.

12b. **History of Political Theory: Modern.** (See Philosophy 10b.) Professor SABINE.

14. **International Law.** Throughout the year. Credit three hours a term. Open to qualified upperclassmen. Professor BRIGGS. M W F 12. *Boardman D.*

A systematic study of the nature, development, and judicial application of the principles of international law. Cases, readings, discussions.

[15. **International Organization.** Second term. Credit three hours. Open to upperclassmen, and to sophomores who have completed Government 9. Professor BRIGGS. M W F 9. *Boardman A.*

The development of international administration, international legislation, collective political intervention, the origin, organization, and working of the League of Nations; the Permanent Court of International Justice. Not given in 1939-40.]

16. **Contemporary American Foreign Policy.** Second term. Credit three hours. Open to sophomores and upperclassmen. Professor BRIGGS. M W F 9. *Goldwin Smith A.*

The foreign relations of the United States during the 20th century; our Caribbean policy; post-war relations with Europe, the League of Nations, and the Far East; neutrality, isolation, and international cooperation.

18. **Introduction to Legal Philosophy.** First term. Credit three hours. Open to upperclassmen. Assistant Professor SHEPARD. T Th S 12. *Boardman A.*

An analysis of various conceptions of the nature of law, historical, analytical, philosophical, and sociological; the problem of the relation between law and the state.

20. **Constitutional Law: The American Federal System.** First term. Credit three hours. Open to upperclassmen. Prerequisite, course 1, course 2 or 3, or the consent of the instructor. Professor CUSHMAN. T Th S 11. *Boardman C.*

Judicial interpretation of the constitution: the nature of judicial review; separation of governmental powers; relations between state and national government; construction of national powers.

[21. **Constitutional Law: Fundamental Rights and Immunities.** Second term. Credit three hours. Open to upperclassmen. Prerequisite, Government 20 or the consent of the instructor. Professor CUSHMAN. T Th S 11. *Boardman C.*

Privileges and immunities of citizenship; protection of civil and political rights; the obligation of contracts; due process of law and the equal protection of the law. Not given in 1939-40.]

22. **Seminary in Constitutional Problems.** First term. Credit two hours. Open to graduate students and qualified seniors. Professor CUSHMAN. T 2-4. *Boardman 5.*

24. **Seminary in International Law and International Organization.** Throughout the year. Credit two hours a term. Open to graduate students and qualified seniors. Professor BRIGGS. Hours to be arranged.

25. **Seminary in Political Theory.** Throughout the year. Credit two hours a term. Open to graduate students and qualified seniors. Assistant Professor SHEPARD. Hours to be arranged.

Problems of recent and contemporary political theory.

26. **Legal and Constitutional Aspects of Labor Problems and Social Insurance.** (See Economics 46.) Professor MONTGOMERY.

[28. **American Political and Constitutional Theory.** Second term. Credit two hours. Open to qualified seniors and graduates. Consult the instructor before registering. Professor CUSHMAN. T Th 9. *Boardman D.*

The philosophical background and evolution of American constitutional doctrines. Not given in 1939-40.]

135. **Local Government.** First term. Professor CATHERWOOD. Lectures, W F 8. *Warren 125.* Laboratory, Th 1:40-4. *Warren 101.*

Historical development, organization, and operation of local government. Particular attention is given to the receipts, expenditures, and administration of counties, towns, and school districts in New York.

[235. **Problems in Financial Administration.** First term. Credit three hours. Alternates with course 236. Primarily for graduate students. Professor CATHERWOOD. Time and place to be arranged.]

Attention is given to a number of problems in governmental financial administration with special reference to New York, including accounting systems, budgetary procedure, borrowing procedure, and debt and tax limits. Fee for materials furnished, \$2. Not given in 1939-40.]

236. **Problems in Public Administration.** First term. Credit three hours. Alternates with course 235. Primarily for graduate students. Professor CATHERWOOD. Time and place to be arranged.]

Attention is given to a number of problems in public administration with special reference to New York, including state and local planning, personnel administration, and administrative organization. Fee for materials furnished, \$2.

Principles of Regional and City Planning. (See Architecture 710.) First term. Credit three hours. Professor CLARKE and Mr. MACKESEY.

May be counted as a related subject for the major in Government.

City Planning Practice. (See Architecture 711.) Second term. Credit three hours. Prerequisite, Architecture 710. Professor CLARKE and Mr. MACKESEY.

May be counted as a related subject for the major in Government.

Regional Planning Practice. (See Architecture 712.) Throughout the year. Credit two hours each term. Prerequisite, Architecture 710. Mr. MACKESEY.

May be counted as a related subject for the major in Government.

Housing. (See Architecture 713.) First term. Credit two hours. Prerequisite, Architecture 710. Professor HARTELL.

May be counted as a related subject for the major in Government.

Seminar in Regional and City Planning. (See Architecture 714.) Throughout the year. Credit one hour each term. Professor CLARKE.

May be counted as a related subject for the major in Government.

Utilitarianism. (See Economics 100.) Throughout the year. Credit three hours a term. A seminar conducted by members of the departments of Economics, Government, History, and Philosophy.

HISTORY

For a major in History the following courses must be completed: (1) in History, at least thirty hours; (2) in related subjects, at least eighteen hours which shall be determined by the student in consultation with his adviser. Of the hours in related subjects, at least six shall be in unstarred courses.

[1. **Outlines of Ancient History.** The Near Eastern Countries, Greece, and Rome to A.D. 337. Throughout the year. Credit six hours on completion of the course. Professor LAISTNER. M W F 9. *Boardman F.*

Textbook, lectures, and collateral reading. Not given in 1939-40.]

2. **Greek Civilization.** First term. Credit three hours. Not open to freshmen. Professor LAISTNER. M W F 9. *Boardman E.*

A survey of the institutions and culture of the Greek World from the eighth to the second century before Christ.

[3. **Greek History, 500 to 323 B. C.** First term. Credit three hours. Prerequisite, History 1 or the equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1939-40.]

[4. **The Hellenistic Age.** Second term. Credit three hours. Prerequisite, History 1 or 3 or a satisfactory equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1939-40.]

[5. **The Roman Republic, 133 to 30 B. C.** Second term. Credit three hours. Prerequisite, History 1 or a satisfactory equivalent. Professor LAISTNER. M W F 11. *Boardman E.* Not given in 1939-40.]

6. **The Roman Empire, 30 B. C. to 180 A. D.** First term. Credit three hours. Prerequisite, History 1 or 5. Professor LAISTNER. M W F 11. *Boardman E.*

[7. **The History of Education (Greek, Roman, and Early Medieval).** First term. Credit two hours. For upperclassmen and graduates only. Professor LAISTNER. T Th 10. *Boardman E.* See Education 3. Not given in 1939-40.]

15. **Chinese History.** Throughout the year. Credit six hours on completion of the course. Not open to freshmen. Assistant Professor BIGGERSTAFF. M W F 9. *Boardman B.*
A general survey of the history of Chinese civilization from the earliest times to the present.

16a. **Modern Chinese Foreign Relations: Political and Economic.** First term. Credit three hours. Prerequisite, History 15 or permission of the instructor. Assistant Professor BIGGERSTAFF. M W F 12. *Boardman B.*

16b. **Modern Chinese Foreign Relations: Cultural.** Second term. Credit three hours. Prerequisite, History 15 or permission of the instructor. Assistant Professor BIGGERSTAFF. M W F 12. *Boardman B.*

21. **Medieval History.** Throughout the year. Credit six hours on completion of the course. Professor STEPHENSON. M W F 10. *Goldwin Smith A.* Quiz sections will normally take the place of the third hour. Fee for materials, \$50.

A general survey of Europe from the fourth to the fifteenth century. Lectures and discussion of text, with outside reading and map work.

22. **The Rise of the Universities.** First term. Credit two hours. Professor STEPHENSON. T Th 10. *Boardman 6.* Students must consult the instructor before registering for this course.

A sketch of learning and education in western Europe from the ninth to the fourteenth century.

23. **Social and Economic History of the Middle Ages.** Second term. Credit two hours. Professor STEPHENSON. T Th 10. *Boardman 6.* Students must consult the instructor before registering for this course.

An introduction to the agrarian economy of the Dark Age, the revival of commerce, and the consequent changes during the later medieval period.

[24. **English Constitutional History to 1485.** Throughout the year. Credit two hours a term. Prerequisite, History 21, History 61, or consent of instructor. Professor STEPHENSON. T Th 10. *Boardman D.*

The development of English institutions as revealed by the study of documentary sources. The work of the first term covers the Anglo-Saxon period, the Norman monarchy, and the reign of Henry II; that of the second term begins with Magna Carta and extends to the Tudor accession. This course will alternate with History 65. Not given in 1939-40.]

32. **The Age of the Renaissance and Reformation.** Second term. Credit three hours. Professor SMITH. M W F 10. *Boardman B.*

The political, social, and religious history of Christendom during this age of transition, with special attention to the beginnings of modern life and thought.

33. **The History of Christianity.** Second term. Credit two hours. Professor SMITH. T Th 10. *Boardman E.*

[34. **Historical Method.** Second term. Credit two hours. Prerequisite, a reading knowledge of either French or German. Professor SMITH. S 10-12. *Boardman 2.* Not given in 1939-40.]

35. **Church History.** Second term. Credit two hours. Open to graduates and qualified seniors. Prerequisite, a reading knowledge of Latin. Professor SMITH. Saturday, 10-12. *Boardman 2.*

[36. **History of Education (Late Medieval and Modern).** Second term. Credit two hours. For upperclassmen and graduates only. Professor SMITH. T Th 10. *Boardman E.* See Education 3. Not given in 1939-40.]

42. **History of Modern Europe.** Throughout the year. Credit three hours a term. Not open to freshmen. Assistant Professor MOSELY. M W F 3. *Goldwin Smith C.*

A survey of European history from the beginning of the 17th century to 1914. Political, economic, and intellectual movements emphasized in proportion to their international or European importance.

43. **French Revolution.** First term. Credit two hours. Prerequisite, first term of History 42, or the permission of the instructor. Professor BECKER. T Th 3. *Boardman B.*

44. **Napoleonic Era.** Second term. Credit two hours. Prerequisite, first term of History 42, or permission of the instructor. Professor BECKER. T Th 3. *Boardman B.*

A study of the rise and fall of the Napoleonic Empire, 1795-1815.

[50. **Recent European History.** First term. Credit three hours. Not open to freshmen. Assistant Professor MOSELY. M W F 11. *Boardman B.*

A survey of the political and social development of Europe since 1914, with special attention to social and national movements as a background for international relations. Not given in 1939-40.]

51a. **History of Russia to 1796.** First term. Credit three hours. Prerequisite, History 42 or permission of the instructor. Assistant Professor MOSELY. M W F 11. *Boardman D.*

51b. **History of Russia since 1796.** Second term. Credit three hours. Prerequisite, History 42 or permission of the instructor. Assistant Professor MOSELY. M W F 11. *Boardman D.*

[52. **Modern History of the Balkans and Near East.** First term. Credit three hours. Prerequisite, History 42 or permission of the instructor. Assistant Professor MOSELY. M W F 11. *Boardman D.* Not given in 1939-40.]

The decline of the Ottoman Empire; the social and political development of nationalities; the impact of imperialism.

[53. **Modern History of the German People.** Second term. Credit three hours. Prerequisite, History 42 or permission of the instructor. Assistant Professor MOSELY. M W F 11. *Boardman D.* Not given in 1939-40.]

The social, political, and cultural evolution of the German People with special attention to the nineteenth and twentieth centuries.

61. **English History.** Throughout the year. Credit six hours on completion of the course. Professor MARCHAM. T Th S 10. *Boardman A.*

A survey of English history from the Anglo-Saxon invasions to the present.

65. **English Constitutional History from 1485 to the present.** Throughout the year. Credit two hours a term. Prerequisite, History 24, or 61, or the consent of the instructor. Professor MARCHAM. M W 2. *Boardman F.*

[66a. **History of England under the Tudors.** First term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. A lecture course with readings in the literature of the time. Not given in 1939-40.]

[66b. **History of England under the Stuarts.** Second term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. A lecture course with readings in the literature of the time. Not given in 1939-40.]

[67. **History of England in the 18th Century.** First term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor. Not given in 1939-40.]

68. **History of England in the 19th and 20th Centuries.** Second term. Credit three hours. Professor MARCHAM. M W F 10. *Boardman C.* Not open to freshmen. Prerequisite, History 61 or the consent of the instructor.

82. **American History, 1607-1850.** First term. Credit three hours. Open to sophomores, upperclassmen, and a limited number of freshmen. Assistant Professor GATES. M W F 9. *Boardman C.*

A survey of American History from the Colonial Period to the Compromise of 1850. Fee for materials, \$1.

83. **American History, 1850 to the present.** Second term. Credit three hours. Open to sophomores, upperclassmen, and a limited number of freshmen. Assistant Professor GATES. M W F 9. *Boardman C.*

A survey of American History from the Compromise of 1850 to the present.

86. **Constitutional and Political History of the United States, 1788-1848.** First term. Credit three hours. Sophomores, juniors, and seniors. Professor BRETZ. M W F 10. *Boardman F.* Apply at *Boardman C* on registration day for seat assignment. Not open to students who have had History 82.

87. **Constitutional and Political History of the United States since 1848.** Second term. Credit three hours. Sophomores, juniors, and seniors. Professor BRETZ. M W F 10. *Boardman F.* Not open to students who have had History 83.

89. **American History, 1750-1848: The Settlement of the Middle West.** Throughout the year. Credit two hours a term. Prerequisite, History 82, 83, 86, 87, or the equivalent. Upperclassmen only. Professor BRETZ. T Th 9. *Boardman E.* Apply at *Boardman C* on registration day for seat assignment.

[91. **Recent American History.** Throughout the year. Credit three hours a term. Prerequisite, History 82, 83 or 86, 87 or the equivalent. Assistant Professor GATES. M W F 12. *Boardman E.* Not given in 1939-40.]

92. **American Colonial History.** First term. Credit three hours. Prerequisite, History 82-83, 86-87, or permission of the instructor. Assistant Professor GATES. M W F 12. *Boardman E.*

93. **Economic History of the United States.** Second term. Credit three hours. Prerequisite, History 82-83, 86-87, or permission of the instructor. Assistant Professor GATES. M W F 12. *Boardman E.*

Interdepartmental Seminar. (Economics, Government, History, Philosophy, and Sociology and Anthropology. See Economics 100.)

MATHEMATICS

For a major in Mathematics, the following courses must be completed: (1) in Mathematics, at least fifteen hours of unstarring courses; (2) in related subjects, at least fifteen hours to be selected from the following list—Astronomy, any courses; Chemistry 405; Economics 21a, 21b; Education 1, 2, 3, 4, 4a, 5, 7, 13; French 1, 3, 3a, 4a, 5a, 5b, 6; Geology 312; German 1, 1a, 3, 3a, 4, 5, 7, 8; Italian 1; Philosophy 1, 2, 3, 5, 15; Physics, any courses.

Students planning to teach Mathematics in secondary schools should make themselves familiar with the New York State requirements. They should bear in mind that the teaching of Mathematics is frequently combined with physical science or general science. The Department of Mathematics recommends, as minimum preparation for teaching the subject, Mathematics 6a, 6b and six additional hours selected from the following list: Mathematics 6c, 6d, 21, 23, 41, 42, 60. Students planning to teach primarily Mathematics should meet the requirements for a major in the subject.

Examinations for the removal of conditions in courses 1 to 8 are held in September just before registration. For further information regarding the time and place of these examinations, students should apply at White 20. No student may take more than one examination the same September.

Students wishing to take any of the courses numbered above 15 are invited to confer with the teachers concerning these courses.

Of courses 1-8, not more than six (6) hours may be taken simultaneously without the special permission of the department.

*1. **Solid Geometry.** Either term. Credit three hours except for students offering Solid Geometry for entrance. First term, M W F 8. Second term, M W F 10.

*2. **College Algebra.** Either term. Credit three hours. M W F 9, T Th S 9.

*3. **Plane Trigonometry.** Either term. Credit three hours except for students offering Trigonometry for entrance. First term, M W F 10, T Th S 8. Second term, M W F 8, T Th S 10.

*5a, *5b. **Analytic Geometry and Calculus.** Primarily for students in the College of Engineering; the prerequisites for such students are Mathematics 3, and Mathematics 1 or 2, or the equivalent. For students in the College of Arts and Sciences the prerequisites for Mathematics 5a are the same as those stated below for Mathematics 6a.

*5a. Daily except S. Credit five hours. Either term.

*5b. Daily except S. Credit five hours. Either term.

*6a, *6b, *6c, 6d. **Analytic Geometry and Calculus.** Primarily for students in the College of Arts and Sciences. Prerequisites, Mathematics 2 and 3, or the equivalent, except that one of these courses may be taken simultaneously with 6a. The Department of Mathematics will offer an optional examination in elementary and intermediate algebra at the beginning of each semester; a student who takes and passes this examination will be admitted to Mathematics 6a without the prerequisite of Mathematics 2 or its equivalent and without taking Mathematics 2 simultaneously with Mathematics 6a. Some students may find their needs adequately covered by 6a and 6b; students interested in Mathematics or allied subjects will be expected to take 6a, 6b, and 6c.

*6a. Either term. Credit three hours. First term, M W F 11, T Th S 11; second term, M W F 11.

*6b. Either term. Credit three hours. First term, M W F 11; second term, M W F 11, T Th S 11.

*6c. Either term. Credit three hours. M W F 11.

6d. Second term. Credit three hours. Prerequisite, Mathematics 6c or 5b. Dr. D. C. LEWIS. M W F 11. *White 21.*

The course will treat certain topics in advanced calculus, such as improper integrals, multiple integrals, line integrals, partial derivatives, and Taylor's theorem for functions of several variables. Special emphasis will be placed upon the physical applications.

***7a, *7b. Analytic Geometry and Calculus.** Open only to students in the School of Chemical Engineering. Prerequisites, Mathematics 3, and Mathematics 1 or 2, or the equivalent.

***7a.** First term only. Credit three hours.

***7b.** Second term only. Credit three hours.

***8. Analytic Geometry and Calculus.** Open only to students in the College of Architecture. Throughout the year. Credit three hours a term. Prerequisites, Mathematics 1, 2, 3, or the equivalent.

***10. Mathematics for Students of Economics and Statistics.** First term. Credit three hours. Dr. CURTISS. M W F 11. *Warren Hall 140.*

Some preliminary training in dealing with mathematical symbolism is first given. The student is then introduced to the concepts of the differential and integral calculus most frequently encountered in statistics and in mathematical treatments of the social sciences. There are no stated prerequisites for the course.

***15. Elementary Course in Higher Mathematics.** Throughout the year. Credit three hours a term. Prerequisites, Mathematics 1, 2, 3, or the equivalent. Professor HURWITZ. M W F 9. *White 6.*

Students who have had the equivalent of any part of Mathematics 6 may receive only partial credit for the second term.

Intended for students who do not plan to take many courses in mathematics, but who wish to become acquainted with the principal ideas of the field. The object will be to make clear the fundamental aims, methods, and results of a number of subjects, rather than to develop the technique of any one. The course will deal with the theory of numbers, vector analysis, groups; synthetic geometry, including some topics in projective, non-euclidean, and higher dimensional geometry; analytic geometry, calculus, famous problems of mathematics. Lectures, assigned reading, and exercises.

[20. Teachers' Course. Second term. Credit three hours. Prerequisite or parallel course, Mathematics 6b or the equivalent.

The course will treat certain selected topics in the algebra and geometry of the secondary school curriculum. Not given in 1939-40: will be given in 1940-41.]

21. Theory of Numbers. Second term. Credit three hours. Prerequisite, Mathematics 6a or the equivalent. Professor HURWITZ. T Th S 10. *White 6.*

Linear and quadratic congruences, primitive roots, and continued fractions.

23. Modern Algebra. First term. Credit three hours. Prerequisite, Mathematics 6b or the equivalent. Assistant Professor JONES. T Th S 11. *White 2.*

A treatment of such topics as determinants, matrices, linear dependence, linear equations, and linear transformations.

31. Algebraic Numbers. Second term. Credit three hours. Prerequisite, Mathematics 21. Assistant Professor JONES. T Th S 10. *White 2.*

Algebraic fields; ideals; cyclotomy and its relation to constructions with ruler and compasses; and other applications.

41. Elementary Differential Equations. Either term. Credit three hours. Prerequisite, Mathematics 6c or the equivalent. Dr. FICKEN. First term, M W F 9. *White 24.* Second term, T Th S 11. *White 9.*

42. Advanced Calculus. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 6c or the equivalent. Assistant Professor RANDOLPH. M W F 11. *White 1.*

A study of the processes of the calculus, their meanings and applications. The course is designed to furnish a necessary preparation for advanced work in analysis and applied mathematics.

44. Infinite Series. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 42 or the equivalent. Professor AGNEW. M W F 11. *White 6.*

First term: An introductory study of convergent series of various types; second term: the modern theory of divergent series with some account of recent research and outstanding problems.

45. Functions of a Complex Variable. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 42 or evidence of high ability in Mathematics 6. Dr. CURTISS. T Th S 9. *White 24.*

The complex number system; linear transformation; the elementary functions; complex integrals and Cauchy's theorem; the Taylor series; singularities of analytic functions; the principle of the maximum; analytic continuation; Riemann surfaces; conformal mapping; integral functions; harmonic functions.

60. Projective Geometry. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 6b or the equivalent. Professor CARVER. M W F 9. *White* 10.

A first course in projective geometry, including both synthetic and analytic methods.

65. Algebraic Geometry. First term. Credit three hours. Prerequisite, Mathematics 60 or the equivalent. Assistant Professor WALKER. M W F 9. *White* 25.

A study of algebraic curves from the point of view of birational transformations.

67a. Differential Geometry. First term. Credit three hours. Prerequisite, Mathematics 6c or the equivalent. Dr. GIVENS. M W F 10. *White* 9.

The theory of curves and surfaces in Euclidean space of three dimensions developed with the use of tensor calculus.

67b. Riemannian Geometry. Second term. Credit three hours. Prerequisite, Mathematics 67a. Dr. GIVENS. M W F 10. *White* 9.

The theory of spaces with a metric defined by a definite or indefinite quadratic differential form. This course and Mathematics 67a will include an adequate treatment of tensor analysis.

74. Elementary Topology. Second term. Credit three hours. Prerequisite, Mathematics 6b or the consent of the teacher. Assistant Professor WALKER. M W F 9. *White* 25.

An elementary treatment of the fundamental concepts of topology.

83a. Probability and Statistics. First term. Credit three hours. Prerequisite, Mathematics 10 or 6a or the equivalent. Dr. FICKEN. T Th S 10. *White* 9.

A survey of those portions of the theory underlying modern Statistical Analysis which are accessible to a student without advanced mathematical training. Specifically the course will include a study of Bernoulli's theorem, the probability integral, the probability of causes, the law of large numbers, continuous probabilities, sampling fluctuations, and the Lexis theory.

84. Dynamics. First term. Credit three hours. Prerequisite, Mathematics 42 or the equivalent. Dr. LEWIS. M W F 10. *White* 21.

An advanced course dealing with such topics as the problem of three bodies, the formal series of dynamics, stability of periodic orbits, recurrent motions, surfaces of section and their applications.

85. Vector Analysis. First term. Credit three hours. Prerequisite, Mathematics 6b or the equivalent. Professor HURWITZ. T Th S 10. *White* 6.

The algebra and calculus of vectors with applications.

100. Problems, Research, and Informal Study. For properly qualified students, members of the department will direct reading and research not necessarily associated with any course.

The following courses are offered frequently, but not every year: Symbolic Logic, Foundations of Mathematics, Theory of Groups, Theory of Equations, Theory of Matrices, Algebraic Invariants, Galois Fields, Linear Algebras, Representation of Groups; Functions of Real Variables, Fourier Series and Integrals, Integral Equations, Calculus of Variations; Introduction to Higher Geometry, Analytic Geometry of Space, Geometry of Hyperspace, Topics in Topology, Complex Projective Geometry, Non-Euclidean Geometry, Tensor Analysis; Differential Equations of Mathematical Physics, Advanced Mathematical Statistics, Orthogonal Functions, Potential Functions, Mechanics, Hydrodynamics and Elasticity, Relativity.

MUSIC

For a major in Music, the following courses must be completed: (1) in Music, twenty to twenty-four hours of advanced courses which students interested in critical and historical work may satisfy by a sequence selected from courses 5, 7, 8, 10, 21, 32, 33, 34, 50, 51, 52, 53, 54, 60, 61 and 100, and which students interested in theoretical work may satisfy by a sequence selected from courses 7, 10, 21, 24, 25, 32, 33, 34, 40, 41, 60 and 61; (2) in related subjects, at least fifteen hours to be selected from courses in Archaeology, Comparative Study of Literature, Education, English, French, German, History, Philosophy, Physics, Psychology, Public Speaking, and Fine Arts. Students who wish to pursue major work in music should consult Professor WEAVER at the beginning of their freshman year, or as soon thereafter as possible.

The University offers opportunities for choral training to students who have the ability to sing through the Sage Chapel Choir, which rehearses in the choir loft of Sage Chapel on Sundays at 10 and on Thursday evenings from 7:30 to 9. The Choir sings at the regular Sunday morning services and at especially scheduled vesper services. Applications for admission to the choir should be made to Professor WEAVER, at the office of the Music Department, 320 Wait Avenue, September 25-27; 9 a. m.-12 m.

The University offers opportunities for instrumental ensemble work to students who play band and orchestral instruments, through the University Orchestra and the University Bands, which are trained and conducted by Mr. GEORGE L. COLEMAN. The University Orchestra rehearses in Morse Hall on Monday evenings from 7:30 to 9:00 and on Thursday afternoons from 4:30 to 5:30. The University Bands rehearse in the Drill Hall on Monday, Wednesday, and Friday afternoons from 4:30 to 5:30. Applications for admission to the Orchestra and Bands should be made to Mr. COLEMAN at the Drill Hall, Monday-Wednesday, September 25-27, 10 a.m.-4 p.m.

The University offers opportunities for chamber ensemble work in string quartets and other chamber music groups. Students who are interested should consult Assistant Professor INGALLS at his office at 320 Wait Avenue at the beginning of the term.

The department owns a large collection of phonograph recordings and piano rolls, and has available a number of instruments on which these may be played. These facilities are available to the entire student body, at the Music Building, on week days between 9 a.m. and 5 p.m. and between 7 p.m. and 10 p.m., and on Sundays between 1:30 and 4:30 in the afternoon.

*1. **Theory and Practice of Music.** One term only; given each term. Credit two hours. Primarily for underclassmen, but open to all students who have had little or no training in music. Students offering music for entrance credit may not take this course for credit. Assistant Professor GORE. T Th 2. 320 Wait Avenue.

An elementary course in the theory of music, including notation and terminology, scale, interval and chord structure, melody writing, ear training, sight reading, and the elements of musical design. This course or its equivalent is prerequisite to all courses in music theory and is recommended as a background for all other courses.

5. **The Art of Music.** Throughout the year. Credit three hours a term. Professor WEAVER. M W F 10. 320 Wait Avenue. Open to sophomores and upperclassmen.

An approach to a rational understanding and enjoyment of the art of music.

7. **Instrumental Ensemble.** Throughout the year. Credit three hours a term. Registration for this course must be approved by the instructor. Assistant Professor INGALLS. T F 3-5. Morse Hall Rehearsal Room.

An approach to the understanding of ensemble music, partly through performance and partly through the study of the music performed and comparable music. The aim of the course is an appreciation of the art as intensified through participation. The course is open to all students who have attained a fair degree of proficiency in performance on some instrument.

8. **The Orchestra.** First term. Credit three hours. Open to all students. Assistant Professor INGALLS. M W F 9. 320 Wait Avenue.

A study of the instruments of the orchestra, their characteristics and capacities, their functions singly and in combinations; and of the orchestra as a whole, and of various aspects of orchestral music. A non-technical course, requiring no ability to play these instruments and taught from the appreciative standpoint.

10. **History of Music.** Throughout the year. Credit two hours a term. Open to sophomores and upperclassmen, and to freshmen by permission. Professor WEAVER. T Th 11. 320 Wait Avenue.

A survey of the evolution of the art of music, with particular reference to questions of style and to the place of music in the artistic and social life of nations. First term, from the beginning of the Christian era to approximately 1800; second term, from approximately 1800 to the present day.

*20. **Harmony, First Year.** Throughout the year. Credit three hours a term. Prerequisite, Music 1 or its equivalent. Registration for this course must be approved by the instructor. Assistant Professor GORE. M W F 12. 320 Wait Avenue.

The construction and interconnection of chords and their inversions, through the harmonizing of assigned and original melodies, and through a consideration of harmonic analysis and form.

21. **Harmony, Second Year.** Throughout the year. Credit three hours a term. Prerequisite, Music 20. Assistant Professor GORE. M W F 9. 320 Wait Avenue.

A continuation of Music 20.

24. **Counterpoint.** Throughout the year. Credit two hours a term. Prerequisite, Music 20 or its equivalent. Assistant Professor HAIGH. T Th 9. 320 *Wait Avenue*.
A course dealing with the principles of melodic combination.

25. **Double Counterpoint, Canon and Fugue.** Throughout the year. Credit three hours a term. Prerequisite, Music 24. Assistant Professor HAIGH. M W F 8. 320 *Wait Avenue*.

A course in advanced counterpoint, leading to fugal writing in the second term.

32. **Historical Survey of Piano Music.** First term. Credit three hours. Prerequisite, Music 10. Assistant Professor HAIGH. M W F 2. 320 *Wait Avenue*.

An illustrated course giving a survey of piano music from its beginnings to the present time.

[33. **Historical Survey of Orchestral Music.** Second term. Credit three hours. Prerequisite, Music 10. Assistant Professor INGALLS. M W F 11. 320 *Wait Avenue*. Not given in 1939-40.]

34. **Historical Survey of Chamber Music.** Second term. Credit three hours. Prerequisite, Music 10. Assistant Professor INGALLS. M W F 2. 320 *Wait Avenue*.

An illustrated course giving a survey of chamber music from its beginnings to the present time.

40. **Composition, First Year.** Throughout the year. Credit six hours on completion of the course; no credit for the first term alone. Prerequisites, Music 20 and 24. Assistant Professor HAIGH. T Th S 10. 320 *Wait Avenue*.

A course in original composition in the smaller forms.

41. **Composition, Second Year.** Throughout the year. Credit six hours on completion of the course; no credit for the first term alone. Prerequisites, Music 25 and 40. Assistant Professor HAIGH. T Th S 9. 320 *Wait Avenue*.

A continuation of course Music 40, involving original composition in the larger forms.

50. **Bach.** First term. Credit two hours. Prerequisite, Music 20, and either Music 32, 33 or 34. Professor WEAVER. M 4-6. 320 *Wait Avenue*.

A study of the life and works of Bach. Special problems will be assigned to each student, related to the field covered by his prerequisite courses.

[51. **Haydn and Mozart.** Credit two hours. Prerequisite, Music 20, and either Music 32, 33 or 34. Not given in 1939-40.]

[52. **Brahms.** Credit two hours. Prerequisite, Music 20, and either Music 32, 33 or 34. Not given in 1939-40.]

53. **Debussy.** Second term. Credit two hours. Prerequisite, Music 20, and either Music 32, 33 or 34. Assistant Professor HAIGH. M 4-6. 320 *Wait Avenue*.

A study of the life and works of Debussy. Special problems will be assigned to each student, related to the field covered by his prerequisite courses.

[54. **Beethoven.** Credit two hours. Prerequisite, Music 20, and either Music 32, 33 or 34. Not given in 1939-40.]

60. **Applied Music, First Year.** Individual instruction in organ, piano, violin. Throughout the year. Credit two hours a term, in the case of students majoring in music; for other students, no credit. Hours to be arranged. Assistant Professors GORE, HAIGH, and INGALLS. 320 *Wait Avenue*.

This course is offered primarily for students wishing to major in music; and in such cases the work of the course is definitely correlated with the theoretical courses being pursued by the student. Whenever the facilities of the department permit, other students are allowed to register for this course without credit. Permission to register for this course, whether with or without credit, should be obtained from Professor WEAVER.

Individual instruction in organ is offered under Assistant Professor GORE, in piano under Assistant Professor HAIGH, and in violin under Assistant Professor INGALLS. Practice facilities are available in each case. Students should consult the instructor at the beginning of the term as to hours for instruction, and the secretary of the department as to hours for practice.

Special fees are charged for this instruction and for the use of practice facilities; information may be obtained from the secretary of the department.

61. **Applied Music, Second Year.** Individual instruction in organ, piano, violin. Throughout the year. Credit two hours a term, in the case of students majoring in

music; for other students, no credit. Hours to be arranged. Assistant Professors GORE, HAIGH, and INGALLS. 320 *Wait Avenue*.

A continuation of course Music 60, open to students who have completed that course or its equivalent. The conditions and regulations applying to Music 60 also apply to this course.

100. Seminary in Musicology. Throughout the year. Credit two hours a term. Primarily for graduates (and by permission for seniors) who have the requisite reading knowledge of one or more of the important foreign languages, a fair knowledge of musical theory, and some skill in practical applied music. Hours to be arranged. Professor KINKELDEY.

The work is intended to make the student acquainted with the accomplishments of the past and with modern methods and aims in all fields, scientific, aesthetic, and historical, of musical research and investigation. Special topics or fields of study will be selected for each term after consultation with the class.

PHILOSOPHY

For a major in Philosophy, the standard requirement is as follows: (1) in Philosophy, twenty-one hours, including courses 1b or 5 and one advanced course, all to be chosen with the approval of the student's adviser; (2) in related subjects, eighteen hours, to be chosen with the approval of the adviser. This requirement, however, will be diminished by six hours to allow for a final comprehensive examination, if the student elects to take such an examination. The courses thus to be omitted will be determined by the adviser. The major may emphasize aesthetics, social studies, history, logic, or religion. In each case an integrated program of studies must be selected, subject to the approval of the adviser.

Courses open to underclassmen:

***1a. Philosophical Classics.** Either term. Credit three hours a term. Open only to freshmen. Registration in *Goldwin Smith 224*.

First term:

Sec. 1, T Th S 9. *Goldwin Smith 227*. Assistant Professor ROBINSON.

Sec. 2, M W F 9. *Goldwin Smith 225*. Assistant Professor SMART.

Sec. 3, M W F 11. *Goldwin Smith 225*. ———.

Sec. 4, M W F 12. *Goldwin Smith 225*. Assistant Professor CHURCH.

Second term:

Sec. 1, T Th S 11. *Goldwin Smith 225*. Professor BURTT.

Reading and discussion of some of the less difficult philosophical classics, selected from works of Plato, Descartes, Berkeley, and others.

1b. Philosophical Classics (second course). Second term. Prerequisite, Philosophy 1a. Assistant Professor ROBINSON. T Th S 9. *Goldwin Smith 227*.

Reading and discussion of somewhat more advanced texts than those used in Philosophy 1a, including Plato, Lucretius, Hume, and Mill.

***2. Logic.** Either term. Credit three hours. Open to freshmen. Registration in *Goldwin Smith 224*.

First term:

Sec. 1, M W F 12. *Goldwin Smith 242*. Assistant Professor SMART.

Sec. 2, M W F 10. *Goldwin Smith 242*. Professor SABINE.

Second term:

Sec. 1, T Th S 10 *Goldwin Smith 234*. Assistant Professor ROBINSON.

Sec. 2, M W F 9. *Goldwin Smith 227*. Assistant Professor SMART.

Sec. 3, M W F 11. *Goldwin Smith 227*. Professor BURTT.

Sec. 4, M W F 12. *Goldwin Smith 227*. Professor SABINE.

An elementary study of the laws of valid inference and the causes of fallacy.

[**Symbolic Logic** (See Mathematics 19). Dr. ROSSER. Not given in 1939-40.]

3. Problems of Philosophy. First term. Credit three hours. Open to sophomores, juniors, and seniors.

Professor CUNNINGHAM. M W F 10. *Goldwin Smith 227*.

Fundamental problems of philosophy and the most important types of philosophical theory.

4. Ethics. Second term. Credit three hours. Open to sophomores, juniors, and seniors. Assistant Professor ROBINSON. M W F 10. *Goldwin Smith 225*.

A study of morals and of theories of right and wrong.

5. **History of Philosophy.** Throughout the year. Credit three hours a term. Open to sophomores, juniors, and seniors. Professor CUNNINGHAM. T Th S 9. *Goldwin Smith* 142.

Philosophical thought from its origin among the Greeks to the present time; the most important systems in their cultural context and their application to social, religious, and educational problems. First term: Greek and medieval philosophy. Second term: modern philosophy to the middle of the nineteenth century; a brief sketch of contemporary tendencies.

8a. **Aesthetics: Psychology of Music and Poetry.** First term. Credit three hours. Open to sophomores, juniors, and seniors. Professor OGDEN. T Th S 11. *Goldwin Smith, Museum of Casts.*

A study of the aesthetic experience as criterion of art and skill. Special topics: music and poetry. Designed for all students interested in the Fine Arts.

8b. **Aesthetics: Psychology of the Fine Arts.** Second term. Credit three hours. A continuation of course 8a, which is prerequisite. Assistant Professor CHURCH. T Th S 11. *Goldwin Smith* 227.

Special topics: painting, sculpture, architecture, and eurhythmics.

[9. **Religious Problems in Contemporary Thought.** First term. Credit two hours. Open to sophomores, juniors, and seniors. Professor BURTT. Th 2-4. First meeting in *Willard Straight* A17. Not given in 1939-40.

Reading and discussion of religious issues raised in the writings of Niebuhr, Huxley, Fosdick, Lippmann, Krutch, and others.]

COURSES FOR UPPERCLASSMEN AND GRADUATES

10a. **History of Political Theory: Ancient.** First term. Credit three hours. Open to juniors and seniors. Professor SABINE. T Th S 10. *Goldwin Smith* 225.

The political philosophy of the city-state: Plato and Aristotle; natural law and the theory of church and state.

10b. **History of Political Theory: Modern.** Second term. Credit three hours. Open to juniors and seniors. Professor SABINE. T Th S 10. *Goldwin Smith* 225.

The theory of the modern state from Machiavelli to the mid-nineteenth century.

Introduction to Legal Philosophy (See Government 18). Assistant Professor SHEPARD.

13. **The Philosophy of Religion.** Second term. Credit three hours. Not open to sophomores. Professor BURTT. M W F 12. *Goldwin Smith* 225.

A study of the major types of religious belief in the modern world in relation to their philosophical background.

[14. **History of Religions.** First term. Credit three hours. Not open to sophomores. Professor BURTT. M W F 12. *Goldwin Smith* 225.

A general survey of the development of ritual, practice, and belief in religions of selected cultures. Not given in 1939-40.]

15. **Philosophy of Science.** First term. Credit three hours. Open to juniors, seniors, and graduates. Assistant Professor SMART. M W F 10. *Goldwin Smith* 221.

A study of the process of scientific reasoning, as illustrated by the historical development of important scientific conceptions, and a discussion of some of the more recent works on the philosophy of science.

19. **Advanced Readings in Aesthetics.** Second term. Credit three hours. Permission of the instructor. Assistant Professor CHURCH. Hours by appointment.

Readings to be selected in accordance with the interests and preparation of the student.

20. **Contemporary Philosophy.** Second term. Credit three hours. Prerequisite, Philosophy 5. Assistant Professor SMART. M W F 11. *Goldwin Smith* 225.

Main tendencies of contemporary philosophy, especially British and American.

[25. **Plato and Aristotle.** Throughout the year. Open to upperclassmen by permission of the instructor. Credit three hours a term. Assistant Professor ROBINSON. T Th S 10. *Goldwin Smith* 220. Not to be given in 1939-40.]

A philosophical study of the two greatest ancient thinkers, based on a reading of substantial parts of their surviving works in translation.

28. **Ethical Theory.** First term. Professor SABINE. T Th S 11. *Goldwin Smith* 220.

29. **The Philosophy of Value.** Professor SABINE. Second term. T Th S 11. *Goldwin Smith* 220.

A study of Naturalist, Realist, and Idealist theories of value.

Interdepartmental Seminary: Utilitarianism. (See Economics 100). By members of the Departments of Economics, Government, History, Philosophy, and Sociology and Anthropology.

PHYSICAL EDUCATION

The following courses, while designed primarily for the training of teachers and directors of physical education in public schools and colleges, have a place in any well-rounded four-year undergraduate course in preparation for secondary school teaching. To receive certification by New York State for teaching in physical education, an additional one or two term's work at an accredited institution will be necessary.

20. **History and Principles of Physical Education.** First term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith* 164. For juniors and seniors.

Outstanding trends and contributions of physical education from the earliest times, together with the basis for physical education in our present society and its relation to general education.

21. **Methods and Materials.** First term. Credit three hours. Professor YOUNG and Mr. GULLION. M W F 8. *Goldwin Smith* 124. For juniors and seniors.

The scope and aims of physical education and the technique in teaching the various activities involved in a comprehensive program.

22. **Community Recreation.** Second term. Credit two hours. Professor YOUNG. T Th 8. *Goldwin Smith* 124.

A study of the need, nature, function and development of a recreational program, together with the agencies and facilities involved in its organization and administration.

23. **Organization, Administration, and Supervision.** Second term. Credit three hours. Professor YOUNG. M W F 8. *Goldwin Smith* 128. For juniors and seniors.

Problems involved in the general organization, administration, and supervision of (a) required physical education in secondary schools and colleges, (b) extra- and intra-mural activities.

24. **Health Supervision of School Children.** Second term. Credit three hours. Dr. GOULD. See Hygiene 3.

25. **First Aid and Safety.** First or second term. Credit one hour. Dr. SHOWACRE. See Hygiene 4.

27. **Tests and Measurements.** Second term. Credit three hours. Professor YOUNG and Mr. JAMES. M W F 12. *Goldwin Smith* 248. For juniors and seniors.

A critical survey of modern trends in physical education tests and measurements with special attention to test construction and methods of using results.

33. **Aquatics: American Red Cross Senior Course.** Second term. No credit. Mr. LITTLE. M T W Th F 4:30, starting March 11. *Old Armory*. (For men only.)

34. **Aquatics: The Teaching of Life Saving and Water Safety.** Second term. No credit. Mr. LITTLE. Monday evenings, 8-10:30 throughout the term. *Old Armory*. New American Red Cross requirements. Prerequisite, Senior American Red Cross certificate.

PHYSICS

For a major in Physics, the following courses must be completed: (1) in Physics, twenty-four hours of unstarred courses, which shall include at least three hours of Course 105, one hour of Course 109, and nine hours selected from Courses 111 to 170; (2) in related subjects, Mathematics 41, and one of the following groups; Astronomy 187; Chemistry, twelve hours, chosen with the approval of the major adviser; Philosophy 5 or 15; Psychology 1 and either 3a or 3b.

Examinations for those who were unavoidably absent from either term examination and for those who have conditions to make up in Courses 11 and 12 will be held on Friday, September 22, 1939, at 9 a.m. in Rockefeller A. Similar examinations in connection with Courses 21 to 62 will be held in Rockefeller A at 2 p.m. on the same day. Students expecting to take any of these examinations should notify the department not later than September 15, 1939.

GENERAL COURSES

*3. **Introductory Experimental Physics.** First term. Credit three hours. Demonstration lectures, M F 9 or 11. *Rockefeller A*. Professor HOWE. One laboratory period a week,

as arranged. *Rockefeller* 220. Laboratory fee, \$5. One recitation period a week, as arranged, required of students who do not offer entrance physics, but open to others. Professor HOWE; Assistant Professor BACHER, and Messrs. BARODY, BOCK, CONNELLY, GREISEN, McCUE, PARKER, and RANDALL.

Mechanics, properties of matter, sound, and heat.

***4. Introductory Experimental Physics.** Second term. Credit three hours. (See also course 6.) A continuation of course 3. Prerequisite, course 3 or entrance physics. Lectures, M F 9 or 11. Assistant Professor BACHER. Laboratory staff as in course 3. Laboratory fee, \$5.

Electricity, magnetism, and light.

***6. Introductory Experimental Physics.** Second term. Credit four hours. Prerequisites, course 3 and the approval of the instructor. Registration limited. Demonstration lectures, M F 9 or 11, same as in course 4. Two recitations, T Th 9 or 11, or as arranged. One laboratory period, T W Th F afternoon, as arranged. Laboratory fee, \$5. Staff as in course 4.

A more extended treatment of the topics of electricity, magnetism, and light than is given in course 4.

***10. Physical Principles.** First term. Credit two hours. Open only to upperclassmen who have not had a college course in Physics. Lectures, demonstrations, and assigned readings. Assistant Professor BACHER. T Th 11. *Rockefeller* B.

Fundamental ideas of physics, including recent developments. Basic principles of mechanics, electricity, light, and the structure of matter with particular emphasis upon their significance in describing physical phenomena. Essentially non-mathematical and non-technical. Designed primarily for those students whose special interests and training have not been in the physical sciences.

***11. Introductory Experimental Physics.** First term. Credit four hours. Prerequisite, Trigonometry. Entrance physics desirable but not required.

Lectures, Professor GRANTHAM. T Th 10 or 12. *Rockefeller* A. Two recitations and one laboratory period a week to be arranged. Laboratory fee, \$5. Professor GRANTHAM, Dr. HARRINGTON, Messrs. BALDOCK, BOWERS, COOPER, FERGUSON, FINLEY, GIVENS, LANCE, MOORE, NEWHALL, PALMATIER, PLATT, and SEDDON.

Demonstrations, theory, problems, and experiments covering the subjects of mechanics, wave motion, sound, and heat.

Courses 11 and 12 are required of students in Engineering.

***12. Introductory Experimental Physics.** Second term. Credit four hours. A continuation of Course 11. May be taken before Course 11. Laboratory fee, \$5.

Electricity, magnetism, and light.

21. General Physics. Either term. Credit three hours. Prerequisites, Physics 11 and 12 and Mathematics 5a and 5b. Two classroom periods a week and one laboratory period on alternate weeks as assigned. Laboratory fee, \$2.50. Professors GRANTHAM and MURDOCK, Drs. HARTMAN, POCKMAN, and TOMBOULIAN, Messrs. TRUELL and VON DER LAGE.

Theory, problems, and laboratory work covering selected topics in electricity and magnetism. Required of candidates for the degree of B.M.E., B.E.E., and B.Chem.E.

22. General Physics. Either term. Credit three hours. Prerequisites, Physics 11 and 12 and Mathematics 5a and 5b. Two classroom periods a week and one laboratory period on alternate weeks as assigned. Laboratory fee, \$2.50. Staff as in Course 21. *Rockefeller*.

Theory, problems, and laboratory work covering selected topics in thermionics, photoelectric effect, light, and heat. Required of candidates for the degree of B.M.E., B.E.E., and B.Chem.E.

41. Modern Physics. First term. Credit two hours. Prerequisites, Physics 21 and 22. Professor SMITH. T Th 11. *Rockefeller* 154. Open only to engineering students.

Discussion and problems covering suitable topics in modern physics, such as electromagnetic theory, kinetic theory of gases, electrons in metals and electrical discharge in gases.

42. Special Topics in Modern Physics. Second term. Credit two hours. Prerequisites, Physics 21 and 22. Professor SMITH. T Th 11. *Rockefeller* 154. Open only to engineering students.

Discussion and problems covering such fields as x-rays, radioactivity, nuclear structure.

***55. Introductory Physical Experiments.** Either term. Credit three hours. Prerequisites, Physics 3 and 4 or the equivalent. Assistant Professor BARNES. Lecture T 10 or W 11. Laboratory, T Th 2-4 or W F 2-4. *Rockefeller* 352. Laboratory fee, \$10.

One lecture and two laboratory periods a week. Fundamental experiments in properties of matter, heat, light, and electricity. Intended primarily for students preparing for Medicine or majoring in Biology.

60. Physical Experiments. Either term or throughout the year. Credit three hours a term. Prerequisites, Physics 3 and 4 and Mathematics 3. Selected experiments available for those who have also had Mathematics 6a and 6b or the equivalent. Professor GIBBS and Dr. CADY. Three hours of laboratory work T and Th, between 8 and 1. Laboratory fee, each term, \$10.

Laboratory work in mechanics, properties of matter, heat, light, and electricity. Experiments selected to meet the needs of the individual student, and designed to give an understanding of fundamental principles. Graphical methods of presenting results are emphasized. Primarily for students in Arts and Sciences. Suitable to accompany Physics 61 or 62 or both, but may be taken separately.

61. General Physics. First term. Credit three hours. Prerequisites, Physics 4 and Mathematics 3 or their equivalents. Professor GIBBS and ————. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering light, magnetism, and electricity.

Physics 61 and 62 are designed to meet the needs of students who desire a somewhat detailed survey of the fundamentals of physics. Physics 60 may suitably accompany either or both of these courses.

62. General Physics. Second term. Credit three hours. Prerequisites, Physics 3 and Mathematics 3 or their equivalents. Professor GIBBS and ————. M W F 8. *Rockefeller* 107.

Primarily for students in Arts and Sciences. Classroom work covering properties of matter, sound, and heat.

Course 62 may be taken either before or after Course 61.

[91. The Teaching of Physics in Secondary Schools.] Second term. Credit two hours. Prerequisites, Physics 60, 61, and 62. Professor HOWE. T Th 8. Given in alternate years, on sufficient demand. Not to be given in 1939-40.]

105. Advanced Laboratory Practice. Either term or throughout the year. Credit three hours a term. Prerequisites, Physics 60, 61, and 62 and Mathematics 6, or their equivalents. Professor COLLINS, Assistant Professor PARRATT, Dr. CADY, and Mr. KRASIK. Laboratory open T W Th F afternoons. *Rockefeller* 301. Laboratory fee, each term, \$10.

For undergraduates. Two laboratory periods and one discussion period a week. Considerable time will be spent on each of a small number of experiments selected to meet the requirements of the individual student. The work may include such topics as electron measurements, ionization potentials, spectroscopy, x-rays, radioactivity, photoelectric emission, alternating current measurements, electric oscillations, and high temperature measurements.

109. Seminar. Either term or throughout the year. Credit one hour a term. Prerequisite, three hours in Physics 105. M 3. Professor MURDOCK. Designed primarily for seniors with a major in physics.

[111. Mechanics.] First term. Credit three hours. Prerequisites, Physics 60, 61, 62 and Mathematics 6, or their equivalents. Professor MURDOCK. Not given in 1939-40.]

Introductory analytical mechanics; material particles, systems of particles, and rigid bodies; oscillations.

[112. Properties of Matter.] Second term. Credit three hours. Prerequisite, Physics 111 or its equivalent. Professor MURDOCK. Not given in 1939-40.]

Gravitation, crystalline state, mechanics of deformable solids and fluids, surface phenomena, diffusion.

120. Electricity and Magnetism. Throughout the year. Credit three hours a term. Prerequisites, Physics 60, 61 and Mathematics 6, or their equivalents. Professor MURDOCK. T Th S 9.

A study of the laws of electrostatic and magnetic fields; electromagnetism and variable current phenomena; thermal and chemical electromotive forces; metallic, electrolytic, and gaseous conduction.

132. Light. Second term. Credit three hours. Prerequisites, Physics 60 and 61 and Mathematics 6, or their equivalents. Professor HOWE. T Th S 8. Given in alternate years.

An introductory study of lens systems, diffraction, interference, double refraction, and polarization.

[142. Heat. Second term. Credit three hours. Prerequisites, Physics 60 and 62 and Mathematics 6, or their equivalents. Professor COLLINS. Given in alternate years, not in 1939-40.]

Temperature scales, specific heats, thermal conductivity, thermodynamics, thermal radiation, high temperature measurements, and kinetic theory.

[162. Wave Motion and Sound. Second term. Credit three hours. Prerequisites, Physics 111 or the equivalent. Given in alternate years, not in 1939-40.]

The general properties of wave motion; a comparative study of elastic waves, waves on the surfaces of liquids and sound waves; a detailed study of sound phenomena.

170. Introduction to Modern Physical Theories. Throughout the year. Credit three hours a term. Prerequisite for part (a), six hours from Physics 105 to 142 inclusive, or the equivalent; for part (b), part (a) or the equivalent. Professor RICHTMYER. M W F 10. Primarily for seniors and first-year graduate students.

a. First term. Early theories, electromagnetic theory, radiation and origin of quantum theory, specific heats, introduction to atomic structure and to atomic and molecular spectra.

b. Second term. Vector model of the atom, x-rays, matter waves, radioactivity, the nucleus and nuclear disintegrations, and other topics selected from modern physics.

200. Introduction to Theoretical Physics. Throughout the year. Credit five hours a term. This course must be preceded or accompanied by Physics 111 and by the first term of Physics 120, or their equivalents. Lectures, Professor Bethe. T Th S 11. Two hours of informal study. Professor KENNARD. See Graduate School Announcement.

213. Theoretical Mechanics. First term. Credit two hours. Prerequisite, the relevant part of Physics 200 or the equivalent. Professor KENNARD. W F 8. Given in alternate years. See Graduate School Announcement.

[222. Electrodynamics. Second term. Credit two hours. Prerequisite, the relevant part of Physics 200 or the equivalent. Professor KENNARD. Given in alternate years, not in 1939-40. See Graduate School Announcement.]

[233. Theoretical Optics. First term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Professor COLLINS. Given in alternate years, not in 1939-40. See Graduate School Announcement.]

254. Kinetic Theory and Statistical Mechanics. Second term. Credit two hours. Prerequisite, the relevant part of Physics 200 or the equivalent. Professor KENNARD. W F 8. Given in alternate years. See Graduate School Announcement.

271. Introductory Quantum Mechanics. First term. Credit three hours. Prerequisite, Physics 200 or the equivalent. Professor SMITH. M W F 9. See Graduate School Announcement.

300. Advanced Laboratory. Either term or throughout the year. Credit three hours a term. Prerequisite, Physics 105 or the equivalent. Professor COLLINS, Assistant Professor PARRATT, Dr. CADY, and Mr. KRASIK. Laboratory open T W Th F afternoons. *Rockefeller* 301. See Graduate School Announcement.

310. Survey of Experimental Methods. First or second term. Credit one hour a term. Prerequisite, Physics 105 or the equivalent. Professor COLLINS and other members of the physics staff. See Graduate School Announcement.

315. Special Topics in Physics. See Graduate School Announcement.

320. Special Topics Laboratory. Either term. Credit two hours a term. Prerequisite, Physics 105 or the equivalent, and the consent of the instructor. See Graduate School Announcement.

405. Mathematical Methods in Physics. Throughout the year. Credit three hours a term. Prerequisite, Mathematics 6 or the equivalent. Professor SMITH. T Th S 9. Given in alternate years. See Graduate School Announcement.

472. Quantum Mechanics of Spectra and Radiation. Second term. Credit three hours. Prerequisite, Physics 271. Professor KENNARD. T Th S 8. See Graduate School Announcement.

[476. **Quantum Mechanics of Solids.** Second term. Credit three hours. Prerequisite, Physics 271. Professor BETHE. Not given in 1939-40. See Graduate School Announcement.]

477. **Quantum Mechanics of Collision Processes.** First term. Credit two hours. Prerequisite, Physics 271. Professor BETHE. W F 9. Given in alternate years. See Graduate School Announcement.

478. **Quantum Mechanics of Nuclei.** Second term. Credit two hours. Prerequisite, Physics 477. Professor BETHE. W F 9. Given in alternate years. See Graduate School Announcement.

[481. **Advanced Quantum Mechanics.** First term. Credit three hours. Professor BETHE. Not given in 1939-40. See Graduate School Announcement.]

571. **Spectroscopy.** Throughout the year. Credit three hours a term. Prerequisite, Physics 132 or the equivalent. Professor GIBBS and Dr. SHAW. M W F 11. Given in alternate years. See Graduate School Announcement.

597. **X-Ray and Electron Diffraction.** First term. Credit three hours. Prerequisite, Physics 170(b) or its equivalent as regards x-rays and matter waves. Professor MURDOCK. M W F 10. Given in alternate years. See Graduate School Announcement.

598. **X-Rays.** Second term. Credit three hours. Prerequisites, Physics 120 and 170, or their equivalents. Assistant Professor PARRATT. T Th S 10. Given in alternate years. See Graduate School Announcement.

[640. **Alternating Currents and Electronics.** Throughout the year. Credit three hours a term. Prerequisites, Mathematics 41 and Physics 300 (three hours) and 320d, or their equivalents. Professor SMITH and Mr. KRASIK. Lectures and laboratory work. Laboratory fee each term, \$7.50. See Graduate School Announcement. Not given in 1939-40.]

PSYCHOLOGY

For a major in Psychology, the following courses must be completed: (1) in Psychology, twenty-one hours including courses 1 and 3a; (2) in related subjects, fifteen hours to be selected in consultation with the adviser from courses in Biology, Chemistry, Education, Mathematics, Music, Philosophy, Physics, and Social Science.

Students who wish to take course 1, 2, or 3a should go, on one of the registration days, to Morrill Hall, north entrance, third floor, for assignment to sections.

1. **Elementary Psychology.** Repeated in second term. Credit three hours. Not open to freshmen. First term, Assistant Professor KREEZER and assistants. Second term, Professor DALLENBACH and assistants. Lectures, *Goldwin Smith C.* First term: T Th 11, M W 12. Second term: M W 12. Recitations, one hour a week, to be arranged.

This course is a prerequisite for all later courses in psychology. It deals with the basic problems and principles of human psychology and is designed as a general foundation for the study of experimental, social, animal, and child psychology, for psychotechnology, and for the psychology of the abnormal. Class demonstrations will supplement the lectures and recitations. Textbook: Boring, Langfeld and Weld. *Introduction to Psychology.*

2. **The Special Psychologies.** Second term. Credit three hours. Prerequisite, Psychology 1. Professor WELD and assistants. Lectures, T Th 11. *Goldwin Smith C.* Recitations, one hour a week, to be arranged.

A survey of the fields of differential, abnormal, animal, genetic, and social psychology.

3a. **Introductory Laboratory.** Either term. Credit three hours. Prerequisite, Psychology 1. First term, Professor DALLENBACH and assistants. Second term, Assistant Professor KREEZER and assistants. M W F 2-4. *Morrill*, Psychological Laboratory. Laboratory fee, \$2.

This course is required for all further laboratory work in psychology. It provides elementary training in the methods of experimentation. A representative series of experiments drawn from the field of psychology will be performed by every student.

3b. **Advanced Laboratory.** Either term. Credit three hours. Prerequisite, Psychology 3a. Dr. RYAN and Mr. J. I. LACEY. M W F 2-4. *Morrill*, Psychological Laboratory. Laboratory fee \$2.

Specimen experimental problems with emphasis upon the analysis of data and the use of statistical techniques in experimentation.

[4. **Intermediate Course in Psychology.** First term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Dr. RYAN. M W F 9. *Morrill* 41.

Intended for students who wish to continue the study of psychology at a more advanced level of presentation. Lectures, textbook assignments, and demonstrations. Not given in 1939-40.]

5. **Perception.** First term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Dr. RYAN. M W F 9. *Morrill* 41.

The place of perception in psychology and its relation to every-day living. A review of the important experiments with special emphasis upon recent developments and upon modern theories of perception.

6. **Memory, Skill, and Work.** Second term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Dr. RYAN. M W F 9. *Morrill* 42.

A study of fundamental experiments and principles. Lectures and readings.

7. **Introduction to Psychotechnology.** First term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Dr. RYAN. T Th S 10. *Goldwin Smith* A.

A study of the results of experimental and statistical analyses of psychological problems in vocational guidance, medicine, law, athletics, and problems of every-day existence.

8. **Psychotechnology in Business and Industry.** Second term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Intended for upperclassmen who intend to enter industrial fields. Dr. RYAN. T Th S 10. *Goldwin Smith* A.

A study of experimental and statistical analyses of psychological problems in vocational selection, industrial production, personnel, advertising, selling, and market research.

9. **Personality.** Second term. Credit three hours. Designed for upperclassmen who are preparing for social work or clinical psychology. Professor WELD. M W F 10. *Morrill* 40.

A study of the concept of personality, its analysis and measurement, its development, integration and social significance.

10. **Social Psychology.** First term. Credit three hours. Prerequisite, junior standing and consent of the instructor. Professor WELD. M W F 11. *Morrill* 40.

11. **Physiological Psychology of the Senses.** First term. Credit three hours. Prerequisite, Psychology I and consent of the instructor. Professor DALLENBACH. M W F 11. *Morrill* 42.

Lectures and demonstrations on the experimental psychology of the special senses together with a study of the nervous structures involved.

12. **Legal Psychology.** Second term. Credit three hours. Prerequisite, Psychology I. Intended for upperclassmen preparing for law. Professor WELD. M W F 11. *Morrill* 40.

Psychological aspects of the origin and growth of the law, and of legal theory; psychological problems of evidence and responsibility.

13. **History of Experimental Psychology.** First term. Credit three hours. Prerequisite, senior standing and consent of the instructor. Professor WELD. T Th S 11. *Morrill* 41.

[14. **Contemporary Psychology.** First term. Credit three hours. Prerequisite, upper-class standing and consent of the instructor. Professor DALLENBACH. T Th S 11. Seminary Room, *Morrill*.

A comparative study of current psychological theory; existential psychology, behaviorism, Gestalt psychology, psychoanalysis, and hormic psychology. Not given in 1939-40.]

15. **Psychology of the Abnormal.** First term. Credit three hours. Prerequisite, Psychology I, upperclass standing, and consent of the instructor. Assistant Professor KREEZER. M W F 10. *Morrill* 42.

A survey of the psychological disorders and deficiencies: maladjustments of normal children and adults; mental deficiency; hysteria, neurasthenia, and psychasthenia; schizophrenia, manic-depressive psychosis, and organic psychoses. A consideration of psychological, physiological, and genetic factors.

[16. **Reading of German Psychology.** Second term. Credit three hours. Prerequisite, consent of the instructor. Hours to be arranged. Assistant Professor KREEZER. *Morrill*, Psychological Laboratory.

The accurate reading and translation of psychological texts and articles. The course presupposes a knowledge of grammar. Not given in 1939-40.]

17. **Animal Psychology.** Second term. Credit three hours. Prerequisite, Psychology 1, upperclass standing, and consent of instructor. Assistant Professor KREEZER. M W F 10. *Morrill* 41.

A study of the behavior and the psychological capacities of animal forms, especially above the invertebrate level. Emphasis will be placed on the relation of research in this field to problems of human psychology.

[18. **Genetic Psychology.** Second term. Credit three hours. Prerequisite, Psychology 1, upperclass standing, and consent of the instructor. Assistant Professor KREEZER. M W F 10. *Morrill* 40.

A study of the individual life-career and the development of the psychological functions. Lectures and textbook assignment. Not given in 1939-40.]

19. **Minor Research Problems.** Either term or throughout the year. Credit three hours a term. Prerequisite, 1, 3a and either 3b or 20, and the consent of the instructor. Professors WELD, DALLENBACH, and Assistant Professor KREEZER. Hours to be arranged. *Morrill*, Psychological Laboratory.

20. **The Correlational and the Psychophysical Methods.** Second term. Credit three hours. Prerequisite, Psychology 3a. Professor DALLENBACH. M W F 2-4. *Morrill*, Psychological Laboratory.

21. **Technique of Experimentation.** Second term. Credit three hours. Primarily for graduate students. Hours to be arranged. Professor DALLENBACH. *Morrill*, Research Laboratory.

A study of the principles and processes of psychological research.

22. **Seminary in Psychology.** First term. Credit three hours. Primarily for graduate students. Hours to be arranged. Professors WELD and DALLENBACH. *Morrill*, Seminary room.

30. **Experimental Psychobiology.** Throughout the year. The first term is not prerequisite to the second. Credit three hours a term. Professor LIDDELL and Assistant Professor ANDERSON. Laboratory, T Th 1:40-4; class hour to be arranged. *Stimson* 28. Fee, \$5 a term.

The principal biological mechanisms of behavior with special reference to man. The animal organism considered as an individual with respect to each of its physiological processes and its influence on personality. First term: functions of the central nervous system including receptor, nerve, muscle, and gland. Second term: activities of the cardiovascular system, respiration; metabolism, digestion, and internal secretion.

31. **Endocrinology and Behavior.** First term. Credit three hours. Assistant Professor ANDERSON. M W 9. One hour to be arranged. *Stimson* 29.

The physiology of the glands of internal secretion with emphasis upon their relation to the behavior of the individual. Informal discussion, selected readings, and demonstrations. For advanced students with consent of the instructor.

32. **The Conditioned Reflex.** Second term. Credit three hours. Professor LIDDELL. W 2-4. One hour to be arranged. *Stimson* 29.

A detailed consideration of the conditioned reflex and the experimental neurosis including a survey of recent advances in neurophysiology as they relate to the problems of behavior. For advanced students with consent of the instructor.

33. **Informal Study and Research in Psychobiology.** Throughout the year. Hours to be arranged. Professor LIDDELL and Assistant Professor ANDERSON. *Stimson*.

Students may participate in the investigations in progress at the Cornell Behavior Station.

PUBLIC SPEAKING

Students may elect a general major, or a major with emphasis on (1) Rhetoric and Public Speaking, (2) Phonetics and Speech Training, (3) Dramatic Production. The following courses must be completed: (1) in the Department, twenty-one hours including nine hours from courses 1, 2, 10 (or 40), 32; (2) in related subjects, six hours of courses not taken in the freshman year in each of the following groups—(a) English, Comparative Literature; (b) History, Government, Economics; (c) Philosophy. Of this total of thirty-nine hours, twenty-four must be in unstarred courses.

Students planning to teach Public Speaking should satisfy basic requirements for a teacher of English. For those preparing to teach English the Department recommends fifteen to eighteen hours in Public Speaking including courses 1, 10 (or 40), 32, 41.

Additional opportunities for practice and training are provided by the University Prize Contests (the Woodford, the '86 Memorial, the '94 Memorial) under Assistant Professor MUCHMORE, by the intercollegiate debate teams under Assistant Professor WAGNER, by the Speech Clinic under Assistant Professor THOMAS, and by the Cornell University Theatre under Professor DRUMMOND and Assistant Professor STANTON.

CORNELL UNIVERSITY THEATRE: Director, A. M. DRUMMOND; Assistant Director, W. H. STANTON; Technical Director, J. COLBY LEWIS; Costumes, ELIZABETH D. WOMAN; Business, JOSEPH H. NORTH.

PUBLIC SPEAKING: ORAL READING

*1. **Public Speaking.** Repeated in second term. Credit three hours. Not open to freshmen. Professor WICHELS, Assistant Professors MUCHMORE and WAGNER, Messrs. HUNTER and DEBOER. M W F 9, 10, 11, 12; T Th S 9, 10, 11.

Planned to give the fundamentals of speech preparation and to develop simple and direct speaking. Study of principles, and constant practice; readings on public questions; conferences.

Foreign students and others whose pronunciation of English falls below the normal standard, and students with special vocal problems, are advised to confer with Assistant Professor THOMAS before registering for course 1.

Fee for materials, \$2.

Students must enroll on registration days at *Goldwin Smith 21*.

*2. **Public Speaking.** Second term. Credit three hours. Prerequisite, Public Speaking 1. Four sections: Assistant Professor WAGNER, M W F 11; Assistant Professor MUCHMORE, M W F 9, 10; Professor WICHELS, M W F 12. All sections, *Goldwin Smith 128*.

Practice in the composition and delivery of speeches for various occasions, in formal and informal group discussion, and in parliamentary procedure; study of problems of interest and persuasion. The '86 Memorial Prize in original oratory is awarded in connection with this course.

Students must enroll on registration days at *Goldwin Smith 21*.

*10. **Oral Interpretation of Literature.** First term. Credit three hours. Not open to freshmen. Dr. ALBRIGHT. Two sections: M W F 10, T Th S 9. *Goldwin Smith 134*.

Training in the interpretative reading of prose and poetry; study of principles; constant practice; conferences for drill.

Students must enroll on registration days at *Goldwin Smith 21*.

11. **Oral Interpretation of Literature.** Second term. Credit three hours. Prerequisite, Public Speaking 10. Assistant Professor THOMAS. M W F 10. *Goldwin Smith 21*.

A continuation of Public Speaking 10 with emphasis on the reading of poetry and of plays.

Students must enroll on registration days at *Goldwin Smith 23*.

12. **Argument and Debate.** First term. Credit three hours. Prerequisite, Public Speaking 1. Assistant Professor WAGNER. Two sections: M W F 11, 12. *Goldwin Smith 227*.

Practice in debate on public questions; study of principles of argument; conferences. Students must enroll on registration days at *Goldwin Smith 21*.

13. **Argument and Debate.** Second term. Credit three hours. Prerequisite, Public Speaking 12. Assistant Professor WAGNER. M W F 12. *Goldwin Smith 234*.

Advanced study of principles and methods; practice in cross-examination, group discussion, and special forms of debate.

Students must enroll on registration days in *Goldwin Smith 21*.

[15. **Advanced Public Speaking.** First term. Assistant Professor MUCHMORE. Not given in 1939-40.]

16. **Forms of Address.** First term. Credit three hours. Prerequisite, Public Speaking 2 or 12. Professor WICHELS. T 11, Th 11-1. *Goldwin Smith 236*.

Practice in composing and delivering various types of public address.

[19. **Oral Expression for Teachers.** Throughout the year. Assistant Professor WAGNER. Not given in 1939-40.]

21. **History of Oratory.** Throughout the year. Credit three hours a term. Not open to freshmen. Professor WICHELS. M W F 10. *Goldwin Smith 236*.

A survey of ancient and modern oratory: Greek and Latin (in translation), English and American. Lectures, readings, and reports.

Students must enroll on registration days in *Goldwin Smith 21*.

23. Classical Rhetoric. First term. Credit three hours. Open to upperclassmen by consent of the instructor. Assistant Professor WAGNER. M 2-4. *Goldwin Smith 245*.

A study, in English translation, of Greek and Latin theories of public address, with illustrations from ancient and modern speeches. Lectures, discussions, and reports.

24. Public Opinion and the Method of Argument. Second term. Credit three hours. Open to upperclassmen. Professor WICHELS. T 11, Th 11-1. *Goldwin Smith 234*.

Current controversies on public questions studied in the light of modern theories of public discussion, mass persuasion, and opinion control. Lectures, discussions, and reports. Fee for materials, \$2.

Students must enroll on registration days at *Goldwin Smith 21*.

[25. British Orators. Second term. Assistant Professor WAGNER. Not given in 1939-40.]

SPEECH IMPROVEMENT AND PHONETICS

***30. Voice Training.** First term. Credit two hours. Open to freshmen. Assistant Professor THOMAS. T Th 9, and an hour to be arranged. *Goldwin Smith 26*.

An elementary course for the improvement of the speaking voice, with attention to the principles of voice production.

Students with special vocal problems are advised to take this course before taking course 1.

Students must enroll on registration days at *Goldwin Smith 23*.

32. Phonetics and Speech Training. First term. Credit three hours. Open by consent of the instructor. Assistant Professor THOMAS. M W F 9. *Goldwin Smith 26*.

Principles of phonetics; study of English pronunciation, based chiefly on contemporary American usage; practice in phonetic analysis and, where necessary, drill for the improvement of individual speech.

Foreign students and others whose pronunciation of English falls below the normal standard are advised to take this course before taking course 1.

Students must enroll on registration days at *Goldwin Smith 23*.

[33. Advanced Phonetics and Speech Training. Second term. Assistant Professor THOMAS. Not given in 1939-40.]

36. Principles of Speech Correction. Throughout the year. Credit three hours a term. Assistant Professor THOMAS. Prerequisite, Public Speaking 33. T 2-4, and an hour to be arranged. *Goldwin Smith 21*.

Study of principles correlated with supervised practice in the Speech Clinic.

Speech Clinic. For students working under the direction of the department. Assistant Professor THOMAS. *Goldwin Smith 23*. By appointment.

DRAMATIC PRODUCTION

***40. Dramatic Interpretation.** Second term. Credit three hours. For freshmen and sophomores. Assistant Professor STANTON. M W F 9. *Goldwin Smith 24*.

Analysis and interpretative reading of various types of dramatic prose and poetry; principles of stage presentation; reports, individual exercises, and group rehearsal.

Students wishing to enroll should consult the instructor by December 1.

41. Dramatic Production: Direction. First term. Credit three hours. Open to upperclassmen by consent of the instructor. Assistant Professor STANTON. M W F 12. *Morse, Stage Laboratory*.

Dramatic interpretation and the related principles of stage direction and production. Lectures, readings, reports, and drill.

42. Advanced Dramatic Interpretation. Second term. Credit three hours a term. Primarily for graduates: open by consent of the instructor to upperclassmen majoring in the Department. Professor DRUMMOND. Th 2-4. *Willard Straight, Rehearsal Room*.

45. Dramatic Production: Stagecraft. Second term. Credit three hours. Open to upperclassmen by consent of the instructor. Assistant Professor STANTON. M W 12; T 1:40-4, or as arranged. *Morse, Stage Laboratory*.

The theory and practice of stage production; planning of small theatres; stage arrangement; problems and practice in scene construction, design, and elements of lighting. Lectures, demonstrations, reports. Laboratory fee, \$5.

45a. **Dramatic Production: Stage Lighting.** First term. Credit two hours. Open by consent of the instructor to graduates and upperclassmen. Assistant Professor STANTON. T 1:40-4, or as arranged. *Morse*, Stage Laboratory.

46. **Stage Design and Theatre Crafts.** First term. Credit three hours. Especially for juniors. Not open to freshmen. Mr. LEWIS. T Th 12; T 2-4:30. *Morse*, Stage Laboratory.

Elementary principles of design applied to architecture, decoration, and furniture for the theatre; laboratory practice in two- and three-dimensional design. Laboratory fee, \$2.

47. **History of Theatrical Costume.** Throughout the year. Credit three hours a term. Especially for juniors. Not open to freshmen. Miss WORMAN. T 2-4, and an hour to be arranged. *Goldwin Smith* 242.

A historical survey of theatrical costuming, and of related period costumes, modes and manners. First term: from Greece of classical times through the continental Renaissance. Second term: from Tudor England to the present.

[48. **History of the Theatre.** Second term. Professor DRUMMOND. Not given in 1939-40.]

[49. **Playwriting.** Throughout the year. Credit three hours a term. Professor DRUMMOND. Not given in 1939-40.]

[49b. **Advanced Playwriting.** Throughout the year. Credit three hours a term. Professor DRUMMOND. Not given in 1939-40.]

66. **Theories of Dramatic Production.** Second term. Credit two hours. Open to seniors by consent of the instructor. Professor DRUMMOND. W 2-4. *Goldwin Smith* 242.

A study of the chief theories of dramatic production in relation to aesthetic principles.

90. **Theatre Practice.** Throughout the year. Credit two hours a term. Open by consent of the instructor to juniors majoring in the department who have taken or are taking Public Speaking 41 or 45. Hours to be arranged. Assistant Professor STANTON. Projects in the productions of the University Theatre.

91. **Theatre Practice.** Throughout the year. Credit two hours a term. Open by consent of the instructor to seniors who have taken one of the following: Public Speaking 41, 45, 46, 47. Hours to be arranged. Assistant Professor STANTON.

Projects in the productions of the University Theatre.

The Department calls the attention of students interested in Dramatic Production to the courses listed under THE FINE ARTS, and to ENGLISH 23, 58, 59, 34, 67, 150.

ROMANCE LANGUAGES

For a major in French, the following courses must be completed: (1) in French, twenty-one hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from courses in English, Fine Arts 411, 412, 425, German, Greek, Ancient and European History, Italian, Latin, Music 10, Philosophy 5, 8, 19, and Spanish.

For a major in Spanish, the following courses must be completed: (1) in Spanish, twenty-one hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from courses in English, Fine Arts 411, 412, 425, French, German, Greek, Ancient and European History, Italian, Latin, Music 10, and Philosophy 5, 8, 19.

For a major in French and Italian, Spanish and Italian, French and Spanish, Spanish and French, the following courses must be completed: (1) in the first language of each pair, fifteen hours of unstarred courses, and in the second language, nine hours of unstarred courses; (2) in related subjects, eighteen hours to be selected from courses in English, Fine Arts 411, 412, 425, German, Greek, Ancient and European History, Latin, Music 10, Philosophy 5, 8, 19, and the Romance language not included in the major.

FRENCH

Students desiring the recommendation of the Department for teaching French are required to take the following courses: 7, 9 (one term), 16, 22, 23, 30.

Students planning to teach French in the secondary schools will find it useful to prepare a second subject of specialization. Latin is particularly recommended. French may be combined with Latin in a course which will fulfill the New York State requirements for teachers of those subjects. The announcement of the Department of Classics and members of the two departments should be consulted.

*1. **First Course for Beginners.** Throughout the year. Credit six hours on completion of the course. M W F 12, T Th S 8.

Students with first-year entrance French should enter the course the second term. A special section will be constituted on T Th S 8 for graduate students.

*3. **Second Course.** First term only. Credit six hours. Prerequisite, French 1, or second year entrance French. Daily 8.

*3a. **Second Course.** Throughout the year. Credit six hours on completion of the course. Prerequisite, French 1, or second year entrance French. M W F 10, 11; T Th S 12. This course is the same in content as 3.

*4a. **Rapid Reading of French.** Repeated in second term. Credit three hours. Prerequisite, French 3, or 3a, or third year entrance French. First term: M W F 9, M W F 12, T Th S 10. Second term: M W F 10.

Translation and rapid reading.

For the satisfaction of the Prescribed Studies, must be taken with or subsequent to 5a.

*5a. **Written and Spoken French.** Repeated in second term. Credit three hours. Prerequisite, French 3 or 3a, or third year entrance French. First term: M W F 11, T Th S 9. Second term: M W F 9, T Th S 10.

5b. **Written and Spoken French.** Repeated in second term. Credit three hours. Prerequisite, fourth year entrance French, or French 5a or 6. First term: T Th S 10. Second term: T Th S 9, 10.

5c. **Written and Spoken French.** Second term. Credit three hours. Prerequisite, French 5b. T Th S 10.

*6. **Freshman French: Reading and Composition.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 3, or 3a, or third year entrance French. Designed primarily for the satisfaction of the prescribed studies in foreign languages. M W F 8, 9, 10, 11, 12; T Th S 9, 10.

7. **Written and Spoken French.** Throughout the year. Credit three hours a term. Prerequisite, French 5b. Professor PUMPELLY. M W F 10, 12. *Goldwin Smith 277.*

Composition, conversation, and discussion of selected topics in French grammar. The course is conducted in French.

9. **Written and Spoken French.** Throughout the year. Credit three hours a term. Prerequisite, French 7. Assistant Professor RIDEOUT. M W F 10. *Goldwin Smith 281.*

Rapid translation from English; themes and talks by students on literary and historical topics. The course is conducted in French.

10. **French Civilization.** Second term. Credit two hours. Prerequisite, three years of entrance French or its equivalent. Open to freshmen. Not accepted in fulfillment of the Prescribed Studies. T Th 11. *Goldwin Smith 290.*

Lectures in English, translation, and outside reading in French, on the general aspects of French civilization.

16. **History of French Literature.** Throughout the year. Credit three hours a term. Prerequisite, fourth year entrance French, French 4a, or French 6. Professor MASON. M W F 11. *Goldwin Smith B.*

Lectures on French literature since the Middle Ages.

17. **Literature of the Seventeenth Century.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor BISHOP. M W F 11. *Goldwin Smith 281.* Lectures and outside reading. This course is conducted in French.

[18. **Literature of the Eighteenth Century.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor BISHOP. M W F 11. *Goldwin Smith 281.*

Lectures and outside reading. This course is conducted in French. Not given in 1939-40.]

19. **The Romantic Movement in French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.*

[20. **Modern French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.* Not given in 1939-40.]

[21. **Contemporary French Literature.** Throughout the year. Credit three hours a term. Prerequisite, French 16. Professor MASON. M W F 9. *Goldwin Smith 290.* Not given in 1939-40.]

22. **French Phonetics.** Second term. Credit two hours. Professor MASON. W F 8. *Goldwin Smith* 290.

23. **French Historical Grammar.** First term. Credit two hours. Prerequisite, one year of Latin. Professor PUMPELLY. T Th 10. *Goldwin Smith* 277.

Lectures on the historical development of French from its origins to the present. Primarily for students intending to teach French.

24. **French Philology.** Throughout the year. Credit six hours on completion of course. Prerequisite, French 5a, 23, and entrance Latin. Professor PUMPELLY. T 10, Th 2. *Goldwin Smith* 277.

Lectures on the historical development of the French language, with a detailed phonological and morphological study of the *Chanson de Roland*. Not given in 1939-40.]

30. **French for Teachers.** First term. Credit three hours. Assistant Professor RIDEOUT. T Th S 9. *Goldwin Smith* 290.

Recommended especially for candidates for the examination for the approval of Oral Credit in New York State.

31. **Literature of the Sixteenth Century.** Throughout the year. Credit two hours a term. Prerequisite, French 16. Professor BISHOP. T Th 12. *Goldwin Smith* 281.

This course is conducted in French. Not given in 1939-40.]

35. **Contemporary France.** Lectures in French. First term. Credit two hours. Mr. ———. T Th 11. Not given in 1939-40.]

36. **Contemporary France.** Lectures in French. Second term. Credit two hours. Mr. ———. T Th 11. Not given in 1939-40.]

41. **Old French Texts.** First term. Credit two hours. Primarily for graduates. Hours to be arranged. Professor HAMILTON.

43. **Old Provençal Philology and Literature.** Second term. Credit two hours. Hours to be arranged. Professor HAMILTON. Not given in 1939-40.]

47. **Modern French Seminary.** Throughout the year. Credit two hours a term. Professor MASON. T 2:30. *Library, French Seminary*.

Primarily for graduates.

ITALIAN

*1. **Elementary Course.** Throughout the year. Credit six hours on completion of course. Professor PUMPELLY. M W F 9. *Goldwin Smith* 277.

This course is continuous through the year and no credit will be allowed for the first term alone.

4. **Italian Poetry.** Throughout the year. Credit three hours a term. Prerequisite, Italian 1. Professor HAMILTON. T Th S 9. *Goldwin Smith* 281.

Dante, *Divina Commedia*; Leopardi, *Rime*; Carducci, *Poesie*, will be read in class. Readings and reports for extra-class work.

14. **Nineteenth Century Literature.** Throughout the year. Credit three hours a term. Prerequisite, Italian 4, or its equivalent. Professor HAMILTON. T Th S 11. *Goldwin Smith* 281.

15. **The Literature of the Italian Renaissance.** First term. Credit three hours. Prerequisite, Italian 4. Professor HAMILTON. Hours and room to be arranged.

Petrarch, *Rime*; Machiavelli, *Principe*; Ariosto, *Orlando Furioso*. Outside readings and reports.

SPANISH

*1. **First Course for Beginners.** Throughout the year. Credit six hours on completion of the course. M W F 12, T Th S 10.

The course is continuous throughout the year and no credit is allowed for the first term alone. Students entering the University with one unit in Spanish should take the second term of course 1.

3a. **Second Course.** Throughout the year. Credit six hours on completion of the course. Prerequisite, Spanish 1, or second year entrance Spanish. Mr. MOORE. M W F 10.

6. **Freshman Spanish.** Translation and composition. Throughout the year. Credit six hours on completion of the course. Prerequisite, Spanish 3a, or third year entrance Spanish. Designed primarily for the satisfaction of the under class requirement in foreign language. Mr. MOORE. M W F 9.

7a. **Intermediate Composition.** First term. Credit three hours. Prerequisite, Spanish 6. Mr. MOORE. T Th S 11. *Goldwin Smith* 290.

7b. **Intermediate Composition.** Second term. Credit three hours. Prerequisite, Spanish 7a. Mr. MOORE. T Th S 11. *Goldwin Smith* 177.

Courses 7a and 7b are conducted in Spanish. Special emphasis is placed on the attainment of accuracy and fluency in both written and oral expression.

8. **Spoken Spanish.** Second term. Credit one hour. Discussion of assigned topics. Prerequisite, consent of the instructor. Professor DALE. W 4:30. *Goldwin Smith* 248.

10. **History of Spanish Literature.** Throughout the year. Credit three hours a term. Prerequisite, Spanish 6 or equivalent. Professor DALE and Mr. MOORE. M W F 12. *Goldwin Smith* 283.

Lectures and assigned reading.

[15. **Drama of the Golden Age.** First term. Credit three hours. Prerequisite, Spanish 6 or equivalent. Professor DALE. T Th S 11. *Goldwin Smith* 277. Not given in 1939-40.]

[17. **Cervantes.** Second term. Credit three hours. Prerequisite, Spanish 6 or equivalent. Professor DALE. T Th S 11. *Goldwin Smith* 277. Not given in 1939-40.]

19. **The Nineteenth Century Spanish Novel.** Second term. Credit three hours. Prerequisite, Spanish 6 or equivalent. Professor DALE. T Th S 11. *Goldwin Smith* 277.

[41. **Old Spanish.** Throughout the year. Credit two hours a term. Professor DALE. Primarily for graduates. W 2:15. *Library, Spanish Seminary.* Not given in 1939-40.]

42. **Calderón and Alarcón.** Second term. Credit two hours. Professor DALE. Primarily for graduates. W 2:15. *Library, Spanish Seminary.*

[43. **The Picaresque Novel.** Throughout the year. Credit two hours a term. Professor DALE. Primarily for graduates. W 2:15. *Library, Spanish Seminary.* Not given in 1939-40.]

SCANDINAVIAN LANGUAGES AND LITERATURES

For a major in Scandinavian Languages and Literatures, the following courses must be completed: (1) in Scandinavian Languages and Literatures, courses 1, and 3 or 4, and six other hours; (2) related subjects, twenty-two hours selected from the following courses: German 15, 16, 17, 37, 42, 43, 47, 48; English 32, 38, 50, 54, 64, 74; History 22, 32, 36, 42; Comparative Study of Literature 103, 104; Classics—Latin 17.

1. **Old Icelandic.** Throughout the year. Credit three hours. Professor HERMANSSON. T Th S 11. *Library, Greek and Latin Seminary.*

2. **Modern Icelandic.** Second term. Credit three hours. Hours to be arranged. Professor HERMANSSON.

3. **Danish and Dano-Norwegian.** First term. Credit three hours. Professor HERMANSSON. M W F 11. *Library, Greek and Latin Seminary.*

[4. **Swedish.** First term. Credit three hours. Professor HERMANSSON. Not given in 1939-40.]

5. **Old Norse-Icelandic Literature.** First term. Credit two hours. Professor HERMANSSON. W F 12. *Goldwin Smith* 221.

Lectures and reading of sagas in translations.

6. **Modern Scandinavian Literature.** Second term. Credit two hours. Professor HERMANSSON. W F 12. *Goldwin Smith* 221.

[7. **Early Scandinavian Civilization and History.** Second term. Credit two hours. Professor HERMANSSON. Not given in 1939-40.]

SOCIOLOGY AND ANTHROPOLOGY

For a major in Sociology and Anthropology the following courses must be completed: (1) twenty-four hours in Sociology and Anthropology; (2) in related subjects, twenty-one hours in the following Departments: (a) History (in addition to the six hours in Prescribed Subjects), (b) Government (except courses 1, 2, and 3), (c) Psychology (except course 1), (d) Economics, (e) Philosophy (except courses 1a, 1b, 2, and 3), (f) Education 7, 18, (g) Agricultural Economics 111, 112, (h) Biology 223, (i) Rural Sociology.

Students registered for a major in Social Science prior to September 1939 may count six hours of courses in Labor Economics as a part of the major requirement in Sociology and Anthropology.

Students registered in the combined Arts-Law course with a major in Sociology and Anthropology will be required to complete a minimum of twelve hours in Sociology and twelve hours in related subjects.

1. Introduction to Sociology and Anthropology. Repeated in second term. Credit three hours. Assistant Professor SHARP and Dr. WEINTRAUB. First term, T Th 9 and an hour to be arranged. *Goldwin Smith C.* Second term, T Th 10 and an hour to be arranged. *Goldwin Smith C.*

A study of man's social and cultural origins and of the factors determining his organic evolution and cultural development.

Fee, in lieu of textbook, \$1.50.

2. Introduction to Sociology and Anthropology. Repeated in second term. Credit three hours. Prerequisite, Sociology 1. Associate Professor WOODWARD and Dr. WEINTRAUB. First term, M W F 2. *Goldwin Smith 256.* Second term, M W F 10, 12, 2, T Th S 9. Rooms to be announced.

The social development of the human personality; the behavior of crowds, nations, social classes, and publics; the social organization of the rural and urban community.

10. The Family. Repeated in second term. Credit three hours. Prerequisite, Sociology 2 or Rural Sociology 1. First term, Professor COTTRELL, T Th S 8. *Goldwin Smith 264.* Second term, Associate Professor WOODWARD. T Th S 11. *Goldwin Smith 264.*

The development of the family as a social institution in modern society; the relation between cultural change and changes in the family pattern; the social psychology of intra-family relationships. Fee for materials, \$1.00.

20. Social Pathology. Second term. Credit three hours. Prerequisite, Sociology 2 or Rural Sociology 1. Professor COTTRELL. M W F 11. *Goldwin Smith 242.*

A study of the underlying factors in social phenomena usually regarded as symptomatic of personal and social mal-functioning, such as economic inadequacy and insecurity, suicide, insanity, social unrest, and community disorganization.

21. Criminology. First term. Credit three hours. Open to social science majors and a limited number of others who have credit for Sociology 2 or its equivalent. Associate Professor WOODWARD. T Th S 11. *Goldwin Smith 264.*

A study of the various factors making for law violation and of society's methods for dealing with the criminal and the juvenile delinquent.

Given in 1939-40 and alternate years.

30. Personality and the Behavior of Groups. First term. Credit three hours. Prerequisite, Sociology 2 or Rural Sociology 1, and one course in psychology. Professor COTTRELL. T Th S 10. *Goldwin Smith 242.*

A study of (1) the organization and functioning of personality regarded as a product of social interaction; and (2) the dynamics of interaction of persons in intra-group and inter-group relations. An attempt is made to develop an integrated social-psychological theory which is relevant to both inter-personal and inter-group behavior. Fee for materials, \$1.00.

31. Pressure Groups and Propaganda. Second term. Credit three hours. Prerequisite, Sociology 2 or Rural Sociology 1. Professor COTTRELL. M W F 2. *Goldwin Smith 156.*

A study (1) of the formation of publics and pressure groups, (2) of propaganda techniques, and (3) of the social effects of increasing resort to propaganda.

[35. Culture and Personality. Second term. Credit three hours. Prerequisite, Sociology 30 and 60, or the permission of the instructors. Professor COTTRELL and Assistant Professor SHARP. Given in alternate years. Not given in 1939-40.]

[40. Population Problems. First term. Credit three hours. Prerequisite, Sociology 2. Associate Professor WOODWARD. Given in alternate years. Not given in 1939-40.]

50. Seminar in Sociology. Throughout the year. Credit two hours a term. Open to senior social science majors, to other qualified upperclassmen by special permission, and to graduate students. Dr. WEINTRAUB. T 2-4.

The topic for discussion in 1939-40 will be "Social Stratification".

60. Social Anthropology. First term. Credit three hours. Prerequisite, Sociology 2 or the equivalent. Assistant Professor SHARP. M W F 11. *Goldwin Smith 264.*

Analysis and comparison of the cultures of selected primitive communities as a basis for the study of more complex societies; elementary forms of social organization; interrelation of elements within a total culture; culture patterns and the individual.

61. **Comparative Social Institutions.** Second term. Credit three hours. Prerequisite, Sociology 2 or the equivalent. Assistant Professor SHARP. M W F 12. *Goldwin Smith* 264.

Economics, religion and social control in selected primitive communities; problems in the cross-cultural study and interpretation of institutional practices, beliefs and values.

[65. **American Ethnology.** Second term. Credit three hours. Prerequisite, Sociology 2 or the consent of the instructor. Assistant Professor SHARP. Given in alternate years. Not given in 1939-40.]

[130. **Social-psychological Methods in Sociological Research.** Second term. Credit two hours. Primarily for graduate students. Professor COTTRELL. Th 2-4. Given in alternate years. Not given in 1939-40.]

140. **Seminar in Population Theory.** First term. Credit two hours. Primarily for graduate students. Associate Professor WOODWARD and Dr. WEINTRAUB. Hours to be arranged.

156. **Seminar in Research Methods in Sociology.** First term. Credit two hours. Primarily for graduate students. Professors SANDERSON and COTTRELL. F 2-4.

157. **Seminar in Quantitative Methods in Sociology.** Second term. Credit two hours. Prerequisite, two courses in statistics, and consent of the instructor. Primarily for graduate students. Professor COTTRELL. Th 2-4.

160. **Seminar in Anthropology.** First term. Credit two hours. For graduate students interested in special aspects of cultural anthropology. Assistant Professor SHARP. Hours to be arranged.

Utilitarianism (See Economics 100). Throughout the year. Credit three hours a term. A seminar conducted by members of the Departments of Economics, Government, History, Philosophy, and Sociology and Anthropology.

Attention is called to the following:

Zoology 223, Physical Anthropology and Human Evolution; Courses in the Department of Rural Sociology; Psychology 10.

UNIVERSITY REQUIREMENTS FOR THE DEGREE A.B. AND B. CHEM.

HYGIENE AND PREVENTIVE MEDICINE

All entering students are required to report to the Medical Adviser's Office to make an appointment for a physical examination during the registration days of the first term. Such examination shall be repeated periodically thereafter as indicated by the results of the first or subsequent examination.

Seniors are required to make an appointment for a physical examination during the regular registration days of their last term of residence.

All students in the first year of undergraduate courses are required to attend a lecture-recitation course in Hygiene and Preventive Medicine given once a week throughout the college year. In the College of Arts and Sciences academic credit of one hour, each term, will be given for satisfactory completion of this work. The credit of two hours for Hygiene 1 and 2 will be included in the one hundred and twenty hours required for the A.B. degree, and added to the requirements for the B.Chem. degree (see page 14).

Hygiene 1 and 2, however, as well as Hygiene 3, 4, 5, 7, and 8 may not be counted in the ninety hours required in the College of Arts and Sciences, but must be counted as part of the thirty hours of electives allowed outside the College (see page 13).

1. Hygiene. First term. Required of all freshmen. Credit one hour. One lecture-recitation each week, with preliminary examination and final. The use of a text-book will be required.

Students must report for registration and assignment to section, in the *Drill Hall*.

Sections for Men: Professor SMILEY, Assistant Professors GOULD, SHOWACRE, and DEYOE.

Sections for Women: Assistant Professors EVANS and CUYKENDALL, and Dr. STELLE.

2. Hygiene. Second term. Required of all freshmen. Credit one hour. One lecture-recitation each week, with preliminary examination and final. The use of a text-book will be required.

Students must report for registration and assignment to section, the men at the *Old Armory*, the women at *Sage Gymnasium*.

Sections for Men: Professor SMILEY, Assistant Professors GOULD, SHOWACRE, and DEYOE.

Sections for Women: Assistant Professors EVANS and CUYKENDALL, and Dr. STELLE.

3. Health Supervision of School Children. Second term. Credit three hours. Assistant Professor GOULD. M W F 12. Histology lecture room, *Stimson*. Registration at Hygiene Office, *Old Armory*.

A practical course of lectures and demonstrations designed to familiarize the student with the facts and methods necessary for making an effective health supervision of school children. Prerequisites, suggested but not demanded: Human Physiology and Anatomy. Open to sophomores, juniors, and seniors.

4. Hygiene: Advanced First Aid. Credit one hour. Prerequisites, Hygiene 1 and 2, and Human Anatomy or Human Physiology. Enrollment limited, and registration only after conference with the professor in charge. First and second terms: F 9. *Anatomy Lecture Room, Stimson*. Assistant Professor SHOWACRE. This course includes the theory of the diagnosis and temporary treatment of the common emergencies with practical application of the essential fundamentals.

5. Industrial Hygiene. First term. Credit two hours. Assistant Professor GOULD. T H 12. Histology lecture room. *Stimson*. Registration at Hygiene Office, *Old Armory*. Prerequisites, Hygiene 1 and 2.

Factory sanitation, ventilation, and illumination; occupational poisoning and disease; factory legislation; accident prevention; fatigue in industry; preventive medicine in industry under the N. R. A.

6. School Hygiene. Professor YOUNG. See Physical Education 24.

7. Hygiene: Rural Hygiene. Second term. Credit one hour. Prerequisites, Hygiene 1 and 2. T 12. Histology lecture room, *Stimson*. Registration at Hygiene office, *Old Armory*. Assistant Professor DEYOE.

A general consideration of the health problems peculiar to rural areas with the presentation of practical schemes for the solution of these problems as far as possible.

8. **Hygiene: Mental Hygiene.** First term. Credit two hours. Prerequisites, Hygiene 1 and 2. Section 1, M F 11. *Stimson*. Assistant Professor DARLING. Section 2, T Th 2. Histology lecture room, *Stimson*. Dr. STELLE. Repeated in second term.

The relationship of the structure of the total personality to environmental mal-adjustment as evidenced by physical and social behavior; a discussion of the more common personality difficulties and the role of insight in the prevention of these.

MILITARY SCIENCE AND TACTICS

1. **Basic Course.** *Required. Throughout the year. The complete course covers two years. Three hours a week, either M T W or Th, 1:40-4:10 P. M.

The course of training is that prescribed by the War Department for Senior Division Units of the Reserve Officers' Training Corps for basic students. Instruction is offered in Infantry and Field Artillery. For details concerning the course see the Announcement of the Department of Military Science and Tactics.

*Required of all able-bodied first and second year male students of the College of Arts and Sciences who are American citizens and candidates for a baccalaureate degree. The requirements of Military Science and Tactics must be completed in the first terms of residence; otherwise the student will not be permitted to register again in the University without the consent of the faculty.

Advanced standing. With the approval of the Department of Military Science and Tactics, credit may be allowed a student for all or part of the Basic Course requirement, upon presentation of evidence of satisfactory work completed at an approved institution.

2. **Advanced Course.** Elective. Throughout the year. Credit two hours a term. The complete course covers two years. Prerequisite, Basic Course in the arm or service elected. Five hours a week, and in addition attendance at a Summer Training Camp of six weeks duration. Hours by assignment. *Drill Hall*.

The course of training is that prescribed by the War Department for Senior Division Units of the Reserve Officers' Training Corps for advanced students. Instruction is offered in Infantry and Field Artillery.

Upon successful completion of the Advanced Course a student may be commissioned as a Reserve Officer of the United States Army, in the appropriate arm or Service, upon the recommendation of the Professor of Military Science and Tactics. For details concerning the course see the Announcement of the Department of Military Science and Tactics.

PHYSICAL TRAINING FOR MEN

1. **For Freshmen Excused from Military Science.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

2. **For Sophomores Excused from Military Science.** Throughout the year. Three periods a week. Class and squad work and prescribed exercises. Mr. O'CONNELL and assistants.

3. **For Juniors and Seniors.** Building up and corrective exercises as prescribed by the Medical Examiners as a result of the physical examination required of all students in the University. Mr. ———.

4. **Wrestling, Boxing, Fencing, Swimming.** Instruction 3-6 daily except Saturday. Mr. O'CONNELL, Mr. WOLF, Mr. COINTE, Mr. LITTLE.

PHYSICAL EDUCATION FOR WOMEN

6. **Physical Education for Women (Freshmen).** Throughout the year. Three periods a week. Misses BATEMAN, ASHCROFT, ATHERTON, ROOT, TOMPKINS, and Mrs. BAIRD.

7. **Physical Education for Women (Sophomores).** Throughout the year. Misses BATEMAN, ASHCROFT, ATHERTON, ROOT, TOMPKINS, and Mrs. BAIRD.

The program consists of six weeks of outdoor sports in fall and spring: Archery, baseball, canoeing, field hockey, golf, soccer, tennis, volleyball. Indoor classes in badminton, basketball, fencing, folk, tap, and modern dancing, golf, individual gymnastics, riding, riflery, swimming, and volleyball.

INDEX

- Accounting, 39.
- Analytical Chemistry, 29.
- Anatomy, 23.
- Animal Biology, 22.
- Anthropology, 23, 80.
- Archaeology, 35.
- Architecture, 48.
- Astronomy, 20.
- Bacteriology, 28.
- Bibliography, 21.
- Biochemistry, 25.
- Biology, 21.
- Botany, 26.
- Chemistry, 28.
- Classics, The, 35.
- Comparative Study of Literature, 37.
- Conservation, 22.
- Cytology, 27.
- Dramatic Production, 75.
- Drawing and Painting, 49.
- Dynamic Geology, 50.
- Economic Geology, 52.
- Economic history and theory, 41.
- Economics, 38.
- Education, 41.
- Embryology, 24.
- English, 43.
- Entomology, 25.
- Finance, 38.
- Fine Arts, 47.
- French, 76.
- Genetics, 27.
- Geography, 51.
- Geology, 50.
- German, 52.
- Government, 55.
- Greek, 35.
- Greek Art, 35.
- Histology, 24.
- History, 57.
- Hygiene, 82.
- Industrial Chemistry, 34.
- Inorganic Chemistry, 28.
- International Trade and Finance, 41.
- Italian, 78.
- Labor and Industrial Relations, 40.
- Latin, 36.
- Mathematics, 60.
- Military Science, 83.
- Mineralogy, 51.
- Modeling, 49.
- Music, 62.
- Neurology, 24.
- Organic Chemistry, 31.
- Organization and Control of Industry, 39.
- Ornithology, 22, 23.
- Paleontology, 52.
- Petrography, 51.
- Philosophy, 65.
- Physical Chemistry, 32.
- Physical Education, 67.
- Physical Geography, 50.
- Physical Training, 83.
- Physics, 67.
- Physiology, 24.
- Plant Physiology, 26.
- Politics, 55.
- Preventive Medicine, 82.
- Psychology, 71.
- Public Speaking, 73.
- Romance Languages, 76.
- Scandinavian Languages, 79.
- Sociology, 79.
- Spanish, 78.
- Stratigraphic Geology, 52.
- Structural Geology, 50.
- Insects, 25.
- Vertebrates, 22.
- Zoology, 22.